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Environmental Cleanup Office

# *DRAFT—Note: Responses are not final, see the Responsiveness Summary for the final responses*

## Comments Received for
## PROPOSED PLAN FOR THE BUNKER HILL SUPERFUND SITE
## Bunker Hill Mine Water Management
## Kellogg, Idaho

### 1. Comments Regarding the Central Treatment Plant and Treatment of AMD

| Comment Number | Received From | Comment | Response |
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| 1.1 | Coeur d'Alene Tribe<br><br>(May 18, 2001) | One issue not discussed at the meeting or in the executive summary of alternatives is the possibility that the treatment plant for the Bunker Hill AMD would be the logical site for future treatment of the CIA seepage – if capping of the CIA does not do the job. This has been discussed often in the past in the context of cleanup issues for the entire BHSF box. I am not sure how we might overlap planning and alternative selection for the mine waste problem with the rest of the ongoing SF cleanup, but it needs to be considered.<br><br>It is likely that the success of the CIA mitigation on the seeps will not be evident for several years, so any future need for a treatment facility is difficult to predict. But if this mine treatment plant could be designed so as to incorporate possible future expansion, it might save a lot of time and money. | As stated in the RI/FS, the initial size of the CTP will be 2,500 gpm. This treatment size reflects the treatment capacity of the filter system that will be installed. The treatment plant will have a hydraulic throughput capacity of 5,000 gpm, which would allow relatively simple treatment capacity increase to 5,000 gpm by addition of more filters and another neutralization/oxidation reactor. If expansion of the plant is required beyond 5,000 gpm, expansion efforts will be dependent on (1) land available, (2) the amount and quality of water to be treated, and (3) OU-4 (Basin) waters that may require treatment and the proximity of their source to the treatment plant.<br><br>The filtered water coming from the plant is expected to meet the water quality outlined in the proposed plan based on the treatability studies conducted during preparation of the RI/FS. Additional treatability studies may be needed if the character of the influent varies significantly from that tested.<br><br>Currently the following additional site waters other than Bunker Hill mine water are treated at the CTP: drainage from the principal threat materials disposal cell in the industrial closure area, the toe drain from the industrial closure area landfill, two vehicle decontamination stations, occasional well development water, and drainage from the old mine water pipeline. At this stage of site remediation it is very difficult to estimate to what extent groundwater extraction may be needed or what other site waters may require treatment, such as surface water run-off, CIA seeps, or water from other site mine adits. |
| 1.2 | Coeur d'Alene Tribe<br><br>(May 18, 2001) | At the meeting the State of Idaho representative did not voice any concern about the long-term O&M costs displayed in the summary. It is the Tribe's understanding that the State will eventually take over all the O&M in the "box," and I assume any treatment plant associated with the Bunker Hill Mine AMD. EPA is now operating the treatment plant; how long will this continue and when will the State of Idaho assume the lead role?<br><br>This question is relevant because the State has consistently voiced concern about any O&M costs that they will be responsible for. The State understandably insists on wanting to minimize these costs, particularly those (like this treatment plant) that go on indefinitely. Our concern is that the State might want to reduce O&M costs by cutting corners or taking risks that might cause failures in meeting TMDL standards in the future. This concern should be openly discussed and resolved, and all agreements by the State adequately documented to assure future managers a good history on the process and costs that the State assumes. | Both the State of Idaho and the EPA have an interest in selecting a cost-effective remedy for mine water treatment that minimizes long term operations and maintenance costs. The State highlighted this as one of their concerns and objectives in the "State Acceptance" portion of the Proposed Plan. Before federal dollars can be spent to implement remedial actions, the Superfund law requires that the state and EPA enter into an agreement under which the state agrees to pay 10% of the costs of the remedial action and to assume the long term operation and maintenance (O&M) of the remedy. EPA and the State of Idaho would have to enter into such an agreement before the actions included in the Bunker Hill Mine Water ROD Amendment could be implemented. State's assume the lead role for O&M at fund-lead sites when the remedial action objectives and remediation goals are achieved, and the remedy is determined to be operational and functional. At this time, there is no date certain for when this will occur for the Central Treatment Plant (CTP). In addition, it is important to note that the governments assumed the ownership and operation of the CTP out of necessity when the former owner/operator went bankrupt. EPA and DEQ believe that ownership and operation of both the mine and the CTP most appropriately belong in the hands of private business. Operation of the CTP by a private enterprise, the preferred approach, could be assumed by an entity that demonstrates the financial capability to operate the plant in an environmentally sound manner, and in accordance with the ROD Amendment. |
| 1.3 | Washington Department of Ecology<br><br>(August 9, 2001) | As you know there is great concern, on a Basin-wide scale, on the need to achieve significant additional metal load reduction in the South Fork of the Coeur d'Alene River associated with the Bunker Central Impoundment Area and surrounding tailings. Current data indicate it is quite probable that groundwater extraction will be a component of a technology package that will assure an appropriate reduction in metals releases into the river. In turn, the extracted groundwater will require treatment. | See Response to Comment #1.1. |
| 1.4 | Washington Dept. of Ecology<br><br>(August 9, 2001) | We are seeking assurances that the Proposed Plan anticipates the future treatment of groundwater and that the CTP is designed in a manner that can accommodate additional sustainable flows associated with future groundwater treatment needs. The facility also should be engineered in a manner that permits efficient expansion as necessary, with adequate real estate to build. We ask that preliminary estimates of potential groundwater extraction rates be developed to assure the plant is designed appropriately. | See Response to Comment #1.1. |

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| 1.5 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Page 6; "Scope and Role of this Proposed Plan": In the earlier ROD for OU2, the wetlands were designed as a polishing step to the CTP. The CTP also was envisioned to be capable of treating additional site surface and ground water. However, none of the alternatives contemplate treatment of the additional flows (Note that Alt 5 is arbitrarily limited to not exceed 5,000 gpm—ever). To make matters worse, because the specific effectiveness of each mitigation measure is unknown, it appears that the ability of the preferred alternative (Alt. 3A) to treat only the AMD component (let alone additional site waters) is in question.<br><br>Judging from historical tests performed to measure the hydraulic properties of the upper and lower aquifers in the area as well as the nature and extent of pore-water contamination within these aquifers, the quality and flow-rates of the so termed "additional waters" could be quite important. | As stated in the RI/FS, average AMD discharge rates from the Kellogg Tunnel are usually between 1,000 and 2,000 gpm. Peaks in the discharge rate of over 6,000 gpm have been observed during precipitation and snowmelt events. One important goal of the proposed plan is to reduce the discharge rate during these precipitation and snowmelt events. The initial sizing of the treatment plant at 2,500 gpm (Alt. 3A) considers use of above ground and in-mine temporary storage for flows in excess of 2,500 gpm. The phased implementation approach acknowledges the uncertainty associated with the mitigations, and allows for future addition of more mitigations or treatment plant capacity if warranted. If all mitigation efforts failed (considered unlikely), the use of the lined pond (7 million gallons) and in-mine storage (210 million gallons) would provide sufficient capacity for the highest mine water flows on record (about 160 million gallons of storage would be needed).<br><br>See Response to Comment 1.1 concerning treatment of additional waters. |
| 1.6 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Page 9; "AMD Treatment": The plan should discuss whether bench-scale treatability tests were performed for "extra-OU3 waters" that are probably more dilute. | The filtered water coming from the plant is expected to meet the water quality outlined in the proposed plan based on the treatability studies conducted during preparation of the RI/FS. Additional treatability studies may be needed if the character of the influent varies significantly from that tested. |
| 1.7 | Spokane Tribe of Indians<br><br>(August 8, 2001) | "Remedies" for numerous OU4-wide locations that are ineffective or partially effective are contemplated in the probabilistic loading model developed for OU4. Subsequently, this model is used to estimate probabilities of achieving the TMDL (or more recently multiples of the TMDL) at specific locations in the Basin at specified durations from initiation of each remedy. Effluent qualities estimated for the CTP appear to be in-stream loads. This means that the design effluent criteria for the CTP essentially usurps the waste load allocation for the entire South Fork at its confluence with Bunker Hill Creek. To make matters worse, it also appears that waste loads from upstream sources that have fallen short of their remedial goals due to ineffective remediation have not been considered. Please clarify. | The probabilistic estimates for OU 4 are documented in the Coeur d'Alene Basin RI/FS Technical Memorandum "Probabilistic Analysis of Post-Remediation Metal Loadings" Revision 1, dated September 2001. As explained in Section 1.2 of that document, the analysis, in its current form, does not explicitly include loadings from the BHSS (except in a "parametric" sense, as further explained in Section 3.4). This means that the estimates for OU 4 loadings and remedial actions have been de-coupled from the BHSS and are thus not influenced by loadings from the CTP. Please refer to the technical memorandum for a complete explanation of the analysis.<br><br>With respect to the CTP, the effluent quality presented in the RI/FS is in the actual discharge, not in the stream. The CTP discharges into Bunker Creek, which is often dry upstream of the discharge location. The anticipated CTP effluent quality is sufficient to meet the CTP TMDL allocation as identified in the August 2000 document and the State and federal water quality criteria--it does not usurp the CTP waste load allocation. The CTP waste load allocation is only for the CTP, it does not include contingency if upstream waste load allocations are not met. Further reduction in CTP discharge metal load will likely not make a significant difference compared to potential upstream loads. |
| 1.8 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Section 1.2.2 "Operable Unit 2"; Page 1-3: It is not clear as to whether remediation of ground and surface waters during Phase II of cleanup activities in OU2 will or could rely on the CTP or similar facilities. If using the CTP is contemplated in the future, upgrade/upscale costs should be discussed and estimated. | See Response to Comment #1.1. |

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| 1.9 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Appendix B; Summary; Page B-1; The purported relationship between quantity of flow entering the FSOB and lime usage at the CTP is unfounded for reasons stated previously. The statement that lime consumption is controlled more by flow than metals concentrations is erroneous. Load of lime consuming COCs is the controlling metric.<br><br>The importance of the role of metal bearing salts is not discussed. Also, such salts can be viewed in several locations in which almost all of the aforementioned tiers are routinely unsaturated. One such area is the HomeStake Portal in the summer. Hysteresis is the divergence that occurs in a "reversible" process. For example, hysteresis is not generally observed in a strain-stress diagram of an elastic medium such as a rubber band unless the elastic limit is exceeded. From this discussion and applying the authors' analytical technique, it would appear that when comparing rising and falling limbs, all flow conditions on either limb would have to be the same, whereas in most instances they physically cannot be the same. For example, initially a large volume of water passes through the largest pores (the mine workings via tunnels) during snowmelt. The resulting falling limb representing drainage from the other tiers presumably would behave differently. When considering the complex wetting and drying cycles and resulting chemistries, the lack of what the authors term as "dissolution-related hysteresis" at monitoring location 9LA (an area where tiers 1-4 probably are saturated) does not necessarily preclude dissolution of salt build-up. Again this discussion is not very convincing as to the importance of salt build-up. In Section 4.2 the authors describe that a high level of "dissolution-related hysteresis" is indicative of "elevated but finite storage of soluble metals…" From this discussion alone, it would follow that with all else being equal, a high level of "non-hysteresis" would be interpreted as being associated with an infinite source of salt/metals/etc. | The statement in the summary indicates that lime consumption is controlled by flow within the Flood Stanly Ore Body. Lime consumption is a function of both flow and concentration of dissolved constituents. The statement is referring to the large flow changes through the Flood Stanley ore Body which result in high lime demand changes. This is supported by historical and recent data.<br><br>Section 4.2 of Appendix B states that buildup of metal-bearing efflorescent salts takes place underground during low flow seasons of the year. The question under consideration is: What is the magnitude of metals that are being stored in the form of easily soluble salts?<br><br>A large degree of separation between the rising and falling limbs on Figures 4 through 6 of Appendix B would demonstrate that a significant amount of metals are stored in the solid phase. On the rising limb, an increase in flow contacts the efflorescent salts, dissolves them, and results in an increase in zinc concentration, and a substantial depletion of salts in the vicinity of existing flow paths. On the falling limb, salts having been depleted near the existing flow paths, the zinc concentrations would be substantially lower than on the rising limb.<br><br>Conversely, little separation between the rising and falling limbs suggests that a smaller portion of the metals are stored in the solid phase than would be the case in the scenario discussed previously. A small degree of separation suggests that more of the metals are stored in high concentration ponds of limited extent than in the solid phase. The rising and falling limbs would exhibit similar concentrations because the metals are being flushed from the liquid phase rather than from the solid phase. On the rising limb, an increase in flow results in discharge from ponds that contain high concentrations of dissolved metals, resulting in an increase in metal concentrations. On the falling limb, discharge from these ponds gradually decreases, resulting in a gradual decrease in metal concentrations, and little separation in the limbs of the hydrograph.<br><br>Many ponds that contain highly contaminated water exist in the underground workings, particularly near the Flood Stanly Ore Body. They typically develop in undulations in the track level of drifts, in low-gradient ditches, or behind muck piles. A few exist behind constructed dams, but these are in the distinct minority. Water quality in these ponds typically is characterized by pH between 1.5 and 2.5, and zinc concentration greater than 20,000 mg/L.. Examples of locations of ponds of this type are as follows:<br><br>Level 3, Homestake Workings, right drift,<br>Cherry 4 level, block caving areas,<br>Bunker Hill 4 level, block caving areas,<br>Level 5, in and around underground greenhouse, upstream of 5WR monitoring location,<br>Level 6, in and around Swette stope,<br>Level 8, near transfer chutes to Stanly cross cut, and<br>Level 9, Stanly cross cut, upstream of 9SX monitoring location. |
| 1.10 | Northwest Mining Assoc.<br><br>(August 10, 2001) | When one reviews the discharge standards to be applied to the CTP, it is difficult to avoid the impression that EPA is applying a different, and far less rigorous, standard to itself than it has applied to the NPDES permits proposed for mines in the vicinity of the CTP. At the very least it again brings into question the technical validity of EPA's TMDL program as well as the process used to develop TMDLs for a given watershed.<br><br>It is NWMA's view that the whole TMDL effort, including the dubious discharge limits it produces, is an overly academic exercise that favors doctrine over reality. If this were not the case, why should the CTP be allowed to release over nine times the mass of cadmium, almost 24 times the mass of lead, and 10 times the mass of zinc than a mine like the Lucky Friday when similar flows are involved? The Association fully appreciates there are differences between the two facilities, yet must still question what is going on.<br><br>Thus, we urge EPA to impose exactly the same effluent limitations on its proposed operation of the CTP as it has included in the draft NPDES permits for Silver Valley mines. This would go a long way to restoring the credibility of the EPA, and also demonstrate conclusively that what it is asking industry to do is technologically achievable and cost-effective. In addition, there are the obvious Basin-wide benefits of further reducing contaminants of concern that would be provided by meeting the more rigorous standards, as well as furthering the goal of restoring the highly impaired fishery of the waters that will receive CTP effluent. | The TMDL for the Coeur d'Alene River basin was finalized by the State of Idaho and EPA in August 2000 after the agencies received and responded to extensive public input. Thus, the TMDL itself is not the subject of this public comment period on proposed CERCLA actions at the Bunker Hill CTP. EPA directs the commentor to the administrative record for the TMDL (particularly the Technical Support Document and Response to Comments), which sets forth the basis for the wasteload allocations for the sources discussed in this comment.<br><br>As indicated in the Technical Support Document, a number of basin characteristics affect the loading capacity and wasteload allocations for individual sources. These parameters include: river flow, river hardness, natural background concentrations, total/dissolved metals translators, and flow rates of discrete sources. The differences in wasteload allocations are due to the variation in these parameters between the target site locations.<br><br>The wasteload allocations for the Bunker Hill CTP were calculated using the same calculation method that was used for the other discrete point sources. Therefore, the suggestion that EPA is applying a different standard to itself than to other sources is erroneous. |

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| 1.11 | (b) (6)<br>July 31, 2001 Public Meeting<br>Transcript (Pg. 23, Line 23) | If Bunker Hill Mine water were just allowed to discharge into the South Fork untreated, (A) would it kill any fish? (B) would it pose a human health hazard? | a) Yes, the release of untreated mine water would pose a threat both to human health and the environment. Untreated mine water entering the South Fork Coeur d'Alene River would raise surface water concentrations of several metals to several thousand ug/L. These concentrations would certainly be lethal to resident fish populations and would probably preclude fish migration. These concentrations would also be in violation of the Clean Water Act, the federal policy created to regulate surface water quality for the protection of human health and the environment.<br><br>b) Risks to human health associated with surface water and discharges in the BHSS were last assessed in the *Non-Populated Areas Human Health Risk Assessment* (SAIC 1992). This assessment was conducted based on data collected by Site PRPs in the late 1980s and early 1990s. Results were compared to MCL, MCLG, and FWQC that were identified as ARARs in effect at that time. Analysis of those data indicated *"One hundred percent exceedance was noted in surface waters in the CIA, Mine/Mill and Complex areas. Exceedances were noted for every metal that has an ARAR for comparison. These waters are highly polluted and represent a significant threat to public health if consumed." (Section 6.3.2).* Current MCLs are more stringent for some metals than those noted in this report. Current BHSS Mine Water discharge monitoring indicates that untreated releases continue to exhibit similar concentrations (CH2M Hill 2001, Tables 1.1 and 2.3) and potential health risks.<br><br>Human health risks associated with current and potential future use of surface waters downstream of the BHSS were evaluated in the HHRA for the Coeur d'Alene Basin (TerraGraphics et al 2001). Numerous exceedances of drinking water criteria were noted throughout the Basin. Evaluation of Coeur d'Alene River water as a drinking water source was accomplished only for future subsistence scenarios. Excessive risk was noted for both disturbed and undisturbed surface waters for subsistence scenarios. Surface waters in the Lower Basin were also found to present excessive risk in recreational scenarios. However, recreational risk was related primarily to incidental ingestion of suspended sediments from disturbed surface water.<br><br>With regard to potential health effects of reintroducing untreated BHSS Mine Water to the South Fork, the central treatment plant (CTP) was built in the 1971 to1973 time period specifically to protect the public health and the environment. It has operated nearly continuously since that time, providing more than an order of magnitude reduction in metals loading from the mine and industrial complex area. Substantial recovery of aquatic life has occurred in contrast to near sterile conditions that prevailed thirty years ago. Estimates of the potential impact of reintroducing untreated mine water discharge to the South Fork of the Coeur d'Alene River would double to quadruple current dissolved metals concentrations and loads (CH2M Hill 2001, Table 2.3 RI/FS). Exceedances of current and proposed MCLs and MCLGs are projected to occur. Use of surface waters impacted by untreated mine water as a drinking water source would likely present an excessive human health risk.<br><br>Release of untreated waters from the Bunker Hill Mine would substantially increase contaminant concentrations downstream and would exacerbate potential downstream health risks for subsistence scenarios. The potential effects of untreated mine water discharge on suspended metal loads or on accumulation of metals in the food chain were not evaluated.<br><br>References:<br><br>CH2M Hill. 2001. Bunker Hill Mine Water Management Remedial Investigation/Feasibility Study. Prepared for U.S. Environmental Protection Agency Region X. April 2001.<br><br>SAIC. 1992. Human Health Risk Assessment for the Non-Populated Areas of the Bunker Hill NPL Site. Prepared for Region X U.S. Environmental Protection Agency. June 1992.<br><br>TerraGraphics and URS Greiner in Association with CH2M Hill. 2001. Final Human Health Risk Assessment for the Coeur d'Alene Basin Extending from Harrison to Mullan on the Coeur d'Alene River and Tributaries, Remedial Investigation/Feasibility Study. Prepared for Idaho Department of Health and Welfare Division of Health, Idaho Department of Environmental Quality, and U.S. EPA Region X. June 2001. |

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| 1.12 | (b) (6)<br>July 31, 2001 Public Meeting<br>Transcript (Page 61, Line 13) | The speaker asked how many major water failures have occurred at the CTP in the last few years and if these were reported to the public. If so, did the EPA fine itself for these failures. | Each month, the operators of the CTP prepare a discharge monitoring report (report) that identifies sample results and flow measurements, plant maintenance activities, inspection results, actions taken to enhance plant performance, any problems encountered or permit exceedances at the CTP, and corrective actions taken. Copies of these reports were included in the Administrative Record for the Bunker Hill Mine Water ROD Amendment and are available for public review. The reports have also been provided in the past to parties upon request including an attorney for the New Bunker Hill Mining Company, the EPA National Ombudsman, and congressional representatives.<br><br>Monitoring at the CTP currently occurs for five parameters: lead, cadmium, zinc, total suspended solids, and pH. Acceptable levels for these five parameters had previously been defined in the NPDES permit for the CTP issued to the Bunker Hill Mining Company in 1986. A review of monthly discharge monitoring reports from January 1999 to the present indicates that zinc levels were exceeded on 21 days, total suspended solids on 3 days, and pH on 1 day. The reasons noted in the reports for these exceedances include equipment failure and process adjustments. The potential for equipment failure in the future will be minimized as the CTP upgrades included in the ROD Amendment are implemented. When an exceedance occurs, it is investigated and corrective actions are taken. No fines are issued as there is no mechanism for the EPA to fine itself for water failures. |

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| 1.13 | Mr. Robert Hopper<br><br>(September 14, 2001) | The EPA's July 31, 2001 public presentation presented, as part of a Power Point program, a chart showing how many times over the allowable limits the contaminants of the mine water were.<br><br>a) Are these limits based upon the old discharge limits or the new (now moot) TMDLs?<br><br>b) If they are based on the new TMDLs, then do they still apply even though the court has in effect disallowed the new TMDLs?<br><br>c) Explain, in lay terms, how the figures were calculated. Example, EPA's chart showing aluminum concentration exceeds standards by 77 times. Explain how this was determined. Then in the same layman's formula, explain the determining process for each of the following contaminants: arsenic, cadmium, copper, iron, lead, mercury, manganese, selenium, thallium, silver, and zinc. | a) The limits are based on either Idaho or federal water quality criteria. They are not based on the TMDLs.<br><br>b) The Total Maximum Daily Load for Dissolved Cadmium, Lead and Zinc in Surface Waters of the Coeur d'Alene River Basin document, jointly issued by EPA and IDEQ in August 2000, was considered in the development of the Bunker Hill Mine Water Management RI/FS. During the RI/FS, treatment technologies for achieving metals reduction at the CTP were identified and evaluated. In addition, numerous CTP effluent flow, river flow, and AMD concentration scenarios were analyzed to determine situations under which the CTP would and would not likely meet the CTP TMDL limits established in the aforementioned document. Based on the results of treatability testing conducted during the RI/FS, the selected remedy for the CTP (addition of tri-media filters and equipment upgrades) is expected to meet the CTP TMDL limits for cadmium, lead and zinc, and the water quality standards and criteria for contaminants of concern.<br><br>On September 4, 2001, a district court judge for the State of Idaho invalidated the TMDLs on the procedural grounds that the Idaho Department of Environmental Quality failed to engage in formal rulemaking when adopting the Coeur d'Alene River Basin TMDLs. The impact of this court decision on TMDLs implementation is currently unclear as the final status of the TMDLs has not yet been determined. The court's decision, however, does not change the range of alternatives described in the RI/FS, the preferred alternative included in the July 2001 Proposed Plan, or the remedy selected in this ROD Amendment. This is because the evaluation and ranking of remedial alternatives for reduction of mine water flows, storage of the mine water, treatment of the mine water, and management of the sludge, are the same regardless of the TMDL.<br><br>The purpose of the AMD mitigations (source control measures) is to reduce the magnitude of the AMD flows to more manageable levels. This is desirable even in the absence of the TMDLs. The CTP in its present form is not capable of producing effluent that consistently meets the current State and federal water quality standards and criteria. Improvements to the CTP are necessary to meet these standards and criteria regardless of whether the TMDL limits are in effect or not. The selected CTP improvements, which are needed to meet the current standards and criteria even in the absence of the TMDLs, include the addition of tri-media filters and equipment upgrades. Filters are a standard technology for reducing suspended solids and enhancing metals removal, and were determined to be the best way to consistently meet the standards and criteria at the least cost. Filters are also desired for their ability to allow operation of the CTP in a high-density sludge mode. Operation in a high-density sludge mode is expected to reduce overall sludge production by more than one-half, and produce sludge management cost savings in excess of the costs to construct and operate the filters. Equipment upgrades at the CTP, such as updated instrumentation, control, electrical, lime handling, and polymer handling systems, are desired to repair or replace old or worn equipment and increase the overall reliability and efficiency of the plant. Therefore, while EPA and IDEQ continue to identify the August 2000 TMDL document in the ROD Amendment, it results in no practical difference to the selected remedy. Please see Section 5.2 of the ROD Amendment for additional discussion of this issue.<br><br>For all of the metals in question, the mine water concentrations were determined from samples collected from the Kellogg Tunnel during the 1998/1999 monitoring program. In the event a metal was reported as not detected or was detected below the quantification limit (the concentration that the laboratory instrument is able to accurately detect), one-half of the detection limit was used as the concentration. For each metal, the concentrations of the samples were summed and divided by the number of samples to determine the Average Raw AMD concentration for that metal. The Average Raw AMD concentration for each metal (Table 1-1 of the RI/FS) was divided by the applicable water quality standard (the lowest water quality standard in Tables 2-3, 2-7, or 2-8 of the RI/FS document for that metal. The result is the number of times the Average Raw AMD concentration for that metal exceeds the applicable water quality standard. The values presented for arsenic, cadmium, copper, lead, mercury, selenium, silver, thallium, and zinc were taken from Table 2-3 of the RI/FS. These values use the most stringent of the limits for either Freshwater or Human Health. The limits presented for Freshwater are the Idaho Water Quality Standards and Wastewater Treatment Requirements for Freshwater Aquatic Life Protection (Chronic) . The limits presented for Human Health are the Idaho Water Quality Standards and Wastewater Treatment Requirements for Human Health Protection for Consumption of Water and Organisms. Water quality standards for aluminum, iron, and manganese are based on federal water quality standards (40 CFR 131). The limits presented for thallium, iron, and manganese was based on limits for consumption of water and organisms. Because the SFCdA River is not a drinking water source, the standard for consumption of organisms would be applicable. For this use the factors would be 5X for thallium, 210X for iron, and 1,300X for manganese. |

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| 1.14 | (b) (6)<br>(September 4, 2001) | (b) (6) had questions regarding sampling results presented in the Bunker Hill Mine Water Management Plan.<br>a) The results in the presentations were the results of the water sampling project of 1989-1990. Why did you not use the results of the water sampling project of 1999-2000 done by your contractor CH2MHILL and DEQ employees?<br>b) Who performed the 1989-1990 sampling?<br>c) Can a split be obtained for umpiring purposes between the two?<br>d) How do the two samplings compare, both in results and criteria?<br>e) Can the results of the CTP be compared with the results of the other treatment plants in the Valley?<br>f) How cost-effective is the operation of the CTP compared to others?<br>g) Why was Mr. Hopper not allowed to operate the CTP as part of the Bunker Hill Mine? Why was he refused by Earl Liverman when he offered to buy the plant?<br>h) How do your costs per gallon compare with the previous owner's costs per gallon?<br>i) Why are you allowed to discharge untreated water without reprimand when other plants are fined for doing so? | a) It was incorrectly stated at the public meeting that the results were from 1989 – 1990. The results were from the 1998 – 1999 sampling program conducted by CH2M HILL..<br>b) EPA is not aware of a 1989 – 1990 program.<br>c) A split sample is not available because there are no samples left over from the 1998 – 1999 sampling program.<br>d) EPA is not aware of a 1989 – 1990 program, therefore a comparison cannot be made.<br>e) There are no other lime treatment plants located in the Valley.<br>f) Cost-effectiveness cannot be compared due to different methods of treatment used. There are no comparable treatment plants to the CTP located in the Valley.<br>g) We understand that in late 1991 and 1992, Mr. Hopper purchased the underground workings, mineral rights, and much of the land surface above the mine from the Bunker Limited Partnership - then owner of the Bunker Hill Mine and operator of the CTP. We don't know why the CTP was not acquired by Mr. Hopper at the same time. The federal and state governments did not assume operation of the CTP until November 1994 following the bankruptcy of BLP, Gulf, and Pintlar corporations. Mr. Hopper expressed an interest in the past in purchasing the CTP as well as other site properties. He was asked by EPA to provide an offer as well as financial information to support his ability to operate the CTP. As no such information was ever received, a serious offer was not determined to have been made.<br>h) A cost comparison to the previous owner's costs has not been performed. EPA is unaware of cost information for the previous owner. EPA would like a copy of any cost information that may be available. Since EPA assumed operation there has been significant repair and maintenance work needed at the plant, and more such work is required as described in Appendix E of the RI/FS.<br>i) EPA has operated the CTP in accordance with the now expired NPDES permit which was last issued to the Bunker Hill Mining Company in 1986. Nothing in that permit gives EPA the authority to discharge untreated water. See also the response to comment 1.12 above. |
| 1.15 | Hecla Mining Company<br>(September 14, 2001) | Our primary emphasis rests upon the CTP plan statements that "…a NPDES permit is not required" (CTP plan, page1) and "…state and federal regulations…were used as guidelines" (CTP plan, page 5). These are major considerations. Potential liabilities of fines and penalties for permit noncompliance at the active mines are absent in the case of the CTP. If similar liabilities were absolutes in the operation of the CTP, EPA contractors would be forced to realistically evaluate compliance with "permit" limits. Given this difference in liability/compliance scenarios between the active mines and the CTP, EPA contractors are able to make statements such as "…with filtration and pH adjustments, the lime treatment process might sufficiently remove dissolved metals" (water management plan, page 9 – emphasis added) and their alternative is "…expected to achieve water quality standards and comply with regulatory requirements" (water management, page 15 – emphasis added). Once a permittee accepts draft permit effluent limits, there is no room for guessing games on either cost-effectiveness or attainability, and failure to comply can carry significant liabilities. | EPA disagrees with the comment's assertion that the standards of operation for the CTP are different because the plant is operated by the government. Under CERCLA, permits are not required for cleanup actions conducted within a Superfund site. Because the discharge from the CTP occurs as part of a Superfund cleanup, an NPDES permit is not required. Even though a permit is not required, the discharge must meet the substantive requirements of the NPDES regulations and be protective. EPA further disagrees with the comment's assumption that the CTP operators do not evaluate compliance with "permit" limits. As identified in comment 1.12 above, the contractors operating the CTP prepare a monthly report which address a variety of operations issues including applicable discharge levels and monitoring results to indicate the achievement of those levels. Any exceedances are investigated and corrective actions are taken. The anticipated CTP effluent quality is based on treatability testing conducted during preparation of the RI/FS. The results of the testing indicated that full-scale treatment using similar procedures should meet the water quality standards. This of course cannot be confirmed at full scale until the full-scale plant is operational and operated for some time. |

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| 1.16 | Hecla Mining Company<br><br>(September 14, 2001) | The costs associated with permit compliance are a key component of any analysis of alternatives, including variances or alternative regulatory mechanisms (i.e., site-specific criteria or changes to designated uses). For example, the Lucky Friday must generate enough revenue to provide for improvements such as additional wastewater treatment, otherwise facility closure is possible. Further, Lucky Friday has no control over the selling price of the metal products. Funds for the operation of the CTP have nothing to do with the self-sufficiency expected at a private operation. Even though the "new effluent limits" for the CTP are only "expected" to be met, costs associated with the selected alternative have capital costs of up to $26.4 million and annual operation and maintenance costs of up to $3.21 million per year. It is not at all clear what portions of these total costs are specifically for wastewater treatment and O&M. Please clarify this with component level detail for both capital expenditures and annual O&M. This information should be available to the public in these specific documents currently out for comment. | A detailed cost breakdown is available in the Bunker Hill Mine Water Management RI/FS in Appendix G (Alternative 3A). For AMD treatment, capital costs are $8,198,000 and annual O&M costs are $797,000. A component level detail breakdown for both capital costs and annual O&M are also in Appendix G. |
| 1.17 | Hecla Mining Company<br><br>(September 14, 2001) | The "Cost" section of the water management plan (page 16) does not discuss the cost-effectiveness of the selected alternative. The "cost-effective" component of an alternative is a statutory requirement as recognized by EPA on page 18 of the water management plan. Interestingly enough, EPA conducted a cost-effectiveness analysis of EPA's 1997 water quality standards rulemaking for Idaho. In EPA's "ECONOMIC ANALYSIS FOR THE FINAL WATER QUALITY STANDARDS FOR IDAHO" (July 21, 1997), EPA estimated the CTP costs to comply with instream National Toxic Rule (NTR) criteria to be $7,436,400 in total capital (1997 dollars) with annual O&M at $4,647,750. EPA estimated the "cost effectiveness" to be $350. Using this EPA methodology, any "cost effectiveness" greater than $200 was NOT considered to be "cost-effective" and alternative regulatory scenarios were warranted. It should be pointed out that the 1997 EPA cost-effectiveness study dealt with effluent limits LESS restrictive than imposed by the TMDL (i.e., the TMDL imposes concentrations less than NTR instream criteria in 100% effluent). Thus, it is expected that the "cost-effectiveness" is even worse under the selected alternative than under the 1997 rulemaking. Please explain why true cost-effectiveness is not addressed. A final word on the CTP "cost-effectiveness" is that the estimated costs for effluent quality at the CTP are for "limits" less restrictive than draft permit limits for the Lucky Friday. | The economic analysis referenced by the comment was performed for EPA's 1997 rulemaking for water quality standards in the South Fork Coeur d'Alene River and tributaries. That analysis in not relevant to the Proposed Plan or ROD Amendment. Under CERCLA, there is a statutory requirement that all Superfund remedies be cost-effective. A cost-effective remedy in the Superfund program is one whose costs are proportional to its overall effectiveness." (NCP Section 300.430(f)(1)(ii)(D)). The overall effectiveness of a remedial alternative is determined by evaluating three of the five balancing criteria used in the detailed analysis of alternatives: long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to determine whether a remedy is cost-effective. For the alternatives considered for the long term management of acid mine drainage from the Bunker Hill mine, this evaluation can be found in Section 8.3 of the ROD Amendment. The selected remedy was determined to be cost-effective. A detailed cost breakdown of the selected remedy is available in the Bunker Hill Mine Water Management RI/FS in Appendix G (Alternative 3A). For AMD treatment, capital costs are $8,198,000 and annual O&M costs are $797,000. |
| 1.18 | Hecla Mining Company<br><br>(September 14, 2001) | The CTP "new effluent limits" (CTP plan, Table 2), when compared with similar parameters in the Lucky Friday permit, show the CTP limits to be: 9.2 times higher for cadmium, 23.6 times higher for lead, 10.2 times higher for zinc, 4.1 times higher for copper, 47.6 times higher for mercury, and 15.6 times higher for silver. It is hard to understand that the Lucky Friday limits are so many times more restrictive when the receiving water at the Lucky Friday supports a healthy fishery, but the receiving water at the CTP discharge point does not. We understand that increased dilution and hardness all play a part in higher metal allowances for the CTP, but wastewater treatment facilities do not recognize receiving water conditions – only that a certain level of treatment will, at a given cost, only provide a certain level of water quality and that, as the allowed metal levels in the discharge decrease, then costs will increase exponentially. We also note that certain CTP "new effluent limits" for non-TMDL parameters do not have pounds per day limits as does the Lucky Friday permit. While we do not believe pounds/day limits are applicable (as commented on in Hecla's draft NPDES permit comments) this provision results in less restrictive conditions than applied to the active mines. At this point, we must point out that EPA does have the authority to issue NPDES permits without actual numeric limits and this may be the time to explore such a possibility for the active mines. | See Response to Comment #1.10 in relation to cadmium, lead, and zinc. The new CTP effluent limits for non-TMDL parameters were developed as described in the June 2001, *Bunker Hill CTP Discharge Quality and Monitoring Plan.* Appendix C provides an example. All the limits were developed following the same guidelines used for the other mine discharge permits, namely EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control.* EPA agrees that pounds per day limits for the CTP should have been included in the Discharge Quality and Monitoring Plan. The plan will be revised. The comment point regarding issuance of NPDES permits without numeric limits is not an activity for which the Superfund program has jurisdiction. Therefore, a response is not provided here. It is suggested that the commentor refer their remark to the permits program in the Office of Water, EPA Region 10. |

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| 1.19 | Hecla Mining Company<br><br>(September 14, 2001) | a) Page 9 of the water management plan, under "AMD Treatment," states "The test showed that lime treatment with filters significantly reduced suspended solids and total metal concentrations." This statement is meaningless. What levels of dissolved metals remained in the effluent of the "Pilot-scale testing" and do these levels meet the "new effluent limits" listed in Table 2, page 6, of the CTP plan? How accurate are pilot-scale results in predicting full-scale operation according to EPA's treatability database? All analysis results of this test work should be included in this document for public comment.<br><br>b) Past studies conducted by EPA indicated that, in order to meet the TMDL load allocations, evaporation and crystallization of the effluent (i.e., zero discharge) was most likely the only treatment to assure meeting the TMDL allocations. Is the reason for such conflicting treatment study results that one study was to determine what is necessary to actually meet TMDL allocations while the current studies consider the TMDL allocations (as well as other "new effluent limits") to be merely guidelines? | a) Section 3.6.1 of the RI/FS discusses the results of the treatability study using the HDS treatment system. Based on the results of the treatability testing, the anticipated CTP effluent concentrations are:<br><br>Cadmium =<0.7 $\mu$g/L<br><br>Lead = <1.0 $\mu$g/L<br><br>Zinc = <70 $\mu$g/L<br><br>As stated in the RI/FS, the treatability study was conducted using the existing CTP. For the filter portion of the testing, a portion of the thickener overflow was diverted through the filters. The treatability testing conducted at the CTP showed that the filters were successful at reducing the suspended solids and total metals concentrations below target goals calculated from TMDL loadings. The accuracy of pilot-test work for predicting full-scale performance cannot be generalized. Every treatment scenario is unique. The report for the CTP treatability study program conducted during the RI/FS is available to the public in the administrative record and also on EPA's Region 10 web site in a downloadable format.<br><br>b) Early during the RI/FS work a variety of treatment technologies were identified as candidates for treating Bunker Hill mine water. One of these was evaporation and crystallization. Other technologies identified were ion exchange, sulfide precipitation, iron co-precipitation, and lime high density sludge. Evaporation and crystallization was never tested, and is not needed. |
| 1.20 | Hecla Mining Company<br><br>(September 14, 2001) | With the absence of liability for CTP discharges above effluent levels, that are no more than guidance, coupled with a true lack of cost-effectiveness for the selected alternative, these studies cannot support the contention that a CTP remedy can in any way be compared with private sector operations. | As the current owner of the CTP, EPA operates the plant in accordance with NPDES regulations as discussed in response to comments 1.12 and 1.15 above. In addition, all remedies selected by EPA must meet applicable or relevant and appropriate requirements (ARARs). For this action, ARARs include current water quality standards and criteria as identified in Sections 5.2, 6.3, and 8.2 of the ROD Amendment. The upgrades and improvements included in the ROD Amendment will improve both the efficiency and reliability of the CTP, as well as ensure that the plant's discharge meets current water quality standards and criteria. Cost effectiveness of the selected remedy is discussed in response to comment 1.17 above. |
| 1.21 | Spokane Tribe of Indians<br><br>(August 8, 2001) | a) Discussions on the implications of historical mining practices on mine water flows are interesting; however, through realistic and truthful re-analysis of historical conclusions drawn by previous workers, the RI/FS concludes that the predicted performance of proposed mitigative measures is uncertain and therefore, cannot be relied upon to reduce mine water outflows or loads. However, it appears that EPA relies on "best guesses" of a group to: (1) estimate a range of the anticipated performances for mitigation measures and then design a CTP to handle remaining waters (see Table 3-2) and (2) screen out technologies that *they think* will not work.<br><br>b) In reality, because of the aforementioned uncertainties associated with the mitigative measures, the entirety of this RI/FS should hinge only on the future of CTP. From this line of reasoning as well as the future probable requirement or need of the CTP to handle extra-mine waters, it is apparent that the CTP should be constructed in a modular or similar fashion that would afford maximum flexibility for changes in CTP head. This flexibility is not readily apparent in the design goals for proposed alternatives. | a) (1) The mitigation effectiveness estimated flow reduction are rough estimated values. The actual effectiveness of the mitigations are unknown. Therefore, mitigation effectiveness was modeled with a range of mitigation effectiveness (see RI/FS Section 4.3 and Table 4-3) to develop possible scenarios for CTP design. (2) Technologies were screened based on the judgement of engineering professionals during reconnaissance of the area and ranking and evaluation meetings.<br><br>b) Contaminant source control is a stalwart of any pollution control effort. The mitigations are source control measures, whose intent are to reduce the amount of AMD requiring treatment. Given the uncertainty of the specific effectiveness of each mitigation, it is reasonable to consider the mitigations and treatment plant capacity in a phased approach during which their performance is monitored. In this phased approach, the CTP is initially sized to treat 2,500 gpm with filters. The phased approach allows for additional mitigations or CTP capacity if required. In-mine and surface storage would be used in the event the KT discharge rate exceeded 2,500 gpm. Also See Response to Comments 1.1 and 1.5. |

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| 1.22 | Ron Roizen, Ph.D.<br>(September 17, 2001) | It is unclear whether the report's authors did or did not assume that periods of peak water flow also harbored proportionately greater burdens of COCs. It is arguable that periods of peak water flow also see proportionally lower burdens of COCs in the water stream, though the report's authors did not appear to have considered this possibility. Second, the proposed remediation alternatives for the Bunker Hill mine water will in fact increase the "expense and effort" of treatment, storage, and sludge, etc. associated with the Bunker Hill mine water. Therefore, it seems odd that one of the "problems" the report seeks to address is that of the "expense and effort" associated with the mine water.<br><br>The concentrations of COCs in the water stream in comparison with flow rates is questioned throughout the comments. Possibly need to show a table of concentrations with flow rate to address this. | Section 2 and Appendix B of the RI/FS provides a full discussion of concentrations of COCs and their correlation with water flow for the Bunker Hill Mine that is referenced throughout the RI/FS. In short, metal loads and acidity of AMD increases with increasing flow rates. This is due to the fact that a greater surface area of AMD producing rock comes into contact with infiltrating water during peak flow events. Also, during peak flow events, flushing of acid salts produced during AMD formation occurs, and ponded acid water that is presence in drifts and other areas are flushed out. Both of the COC release mechanisms are more significant at higher than lower flows.<br><br>The expense and effort required for management of the Bunker Hill mine water is substantial. The Proposed Plan describes the required remedial actions and the Preferred Alternative. |
| 1.23 | Ron Roizen, Ph.D.<br>(September 17, 2001) | It is noted in the report that equipment associated with water treatment is aging or aged and requires replacement. This sort of "problem" would of course occur in any mine water management plan, including that presently in place. | EPA agrees with this comment. While some of the changes to the CTP identified in the ROD Amendment will aid in achieving lower levels of metals in the plant's discharge (e.g., installation of tri-media filters), others will be undertaken to repair, maintain, or upgrade aging or ineffective equipment. |
| 1.24 | Ron Roizen, Ph.D.<br>(September 17, 2001) | It is noted that the current CTP "cannot produce treated water that will meet the recently finalized TMDL-based discharge levels and State of Idaho surface water quality criteria." This assertion has of course been mooted for the time being with the dislodgement of relevant TMDLs. It may also be noted that this assertion appears to supply the reason for significant changes to the existing system, as the wear and tear on equipment or the filling of the CIA represent merely conventional problems faced by the present system. | Improvements to the CTP are required regardless of the status of the TMDLs. See response to comment 1.13 above. For example, installation of tri-media filters at the CTP is necessary to meet the State of Idaho water quality standards and federal national recommended water quality criteria (identified in Tables 2 and 3 of the ROD Amendment) regardless of whether the TMDL limits are in effect or not. More general plant upgrades (e.g., rehabilitation of existing treatment equipment, improvements to the lime and polymer feed systems, and replacement of the mostly inoperable control system) are required to replace old and worn equipment and ensure reliable treatment operations into the future. |
| 1.25 | Ron Roizen, Ph.D.<br>(September 17, 2001) | The NCP requires articulation of a "No Further Action" alternative. The report's authors have biased this alternative's description by equating it with a "do nothing" meaning rather than "continue to do what we have been doing," meaning the necessary up-keep and other servicing being supplied as needed. By equating the "NFA" alternative with doing nothing – in effect, no normal and ordinary costs associated with the maintenance of the system now in place – the report stacks the deck against the consideration of the present system (with repairs and maintenance) and the "NFA" alternative. | All Superfund actions include the consideration of a no-action alternative as required by the National Contingency Plan (40 CFR 300.430(e)(6)). The no-action alternative is commonly used as a baseline alternative against which other alternatives are judged. Generally, as the name implies, the no-action alternative is a "do nothing" option. In instances where some remedial action has already occurred at the site, the no-action alternative may be considered a no further-action alternative. Since treatment and sludge disposal already occur at the site, EPA and DEQ believed that the existing treatment and disposal system best reflected the "no further-action" scenario. In defining the no further-action alternative (Alternative 1 in the RI/FS), EPA and DEQ agreed that it would include ongoing operations and maintenance of the treatment plant, but not include any significant upgrades to the plant or construction of additional sludge disposal facilities. We assumed that the treatment plant would have to be shut down in 3 to 5 years when sludge disposal capacity was exhausted. The cost estimate for Alternative 1 does in fact include what the commentor noted as "normal and ordinary" costs associated with the maintenance of the current system for a period of four years (the average expected duration of the existing sludge disposal facility). The commentor further states that because of the way that the no further-action alternative was constructed, the RI/FS report is biased against simply maintaining the present system. EPA notes that because the present treatment system is not capable of consistently achieving current water quality standards and criteria, especially for cadmium and lead, it does not meet the threshold criteria of protecting human health and the environment and compliance with ARARs that is necessary for any selected remedy. |
| 1.26 | Ron Roizen, Ph.D.<br>(September 17, 2001) | a) Dr. Roizen suggests that the cost of O&M of the current system would be far less than the O&M for the proposed CTP.<br><br>b) Dr. Roizen commented that no evidence is offered that the use of the current system would have "palpable human health or eco-environmental costs." | a) The estimated annual operations and maintenance costs for the current treatment plant (Alternative 1) as identified in the RI/FS Appendix G are $682,000. The estimated annual operations and maintenance costs for the treatment system identified in Alternative 3, the selected remedy, are $797,000. These costs are similar because except for the addition of tri-media filters and a backup power system, other upgrades and improvements are generally expected to repair or replace already existing equipment. As noted in the comment above, the present treatment system is not capable of consistently achieving current water quality standards and criteria, especially for cadmium and lead. These standards and criteria were developed to be protective of aquatic organisms and human recreational uses.<br><br>b) See Response to Comment 1.11 b. |
| 1.27 | Ron Roizen, Ph.D.<br>(September 17, 2001) | The assertion that the existing CTP would shut down in 3-5 years is based on the fact that the CIA will be full at this time. Alternative 1 should be revisited to look at the cost of O&M of the existing system and use of one of the sludge management options used for the other alternatives. This should also be used to determine the short-term effectiveness of the current CTP. | The cost estimate for operation and maintenance of the existing treatment plant ($682,000 per year) is documented in Appendix G of the RI/FS. This figure is based on actual CTP expenditures over the last three years. Alternative 1, the present water treatment system, cannot be relied upon to consistently achieve current water quality standards and criteria. In addition, Alternative 1 takes no action to address the other remedial action objectives identified in the Proposed Plan and RI/FS including: reduction in the volume of sludge generated at the CTP; reduction in the concentrations and mass per day of metals discharged into Bunker Creek and the SFCdA River; and reduction in the quantity of acid mine drainage generated by the mine. See also responses to comments 1.25 and 1.26 above. |

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| 1.28 | Ron Rolzen, Ph.D.<br>(September 17, 2001) | The author returns to the 1992 ROD to ask what is different between 1992 and 2001 that requires attention to mine water now when it was ignored in 1992? | The commentor is referred to Sections 1.3, 3.0, 4.0 and Table 1 of the ROD Amendment. These sections discuss the circumstances that led to the need for a ROD Amendment and the significant differences between the 1992 ROD and the current ROD Amendment as they relate to the long-term management of acid mine drainage from the Bunker Hill mine. |
| 1.29 | (b) (6) | Could we not look at your record of success at the CTP? I have seen 10 years of your failure to meet the same water quality standards from your treatment plant that you hold other operators of treatment plants in the Valley to. Why do you think we (the public) should let you take on the management of the mine knowing your failure to manage the CTP? | Please see responses to comments 1.12 and 1.15 above. Those responses address record keeping, exceedances of permit limits, and operating standards at the CTP. In addition, EPA and IDEQ note that it is not the government's intention to take on the management of the Bunker Hill mine as indicated by the commentor. However, long-term management of acid mine drainage from the Bunker Hill mine will require close coordination with the mine owner in order to monitor the effectiveness of source control measures, provide for readily available in-mine water storage capacity, and ensure the continued collection and conveyance of acid mine drainage from the mine to the CTP for treatment. For further information on this topic see the Community Acceptance discussion in the ROD Amendment under Section 6.3. |
| 1.30 | (b) (6) | Without improving the [CTP] discharge one iota – they have run the operational costs of the plant from $40,000 the last year the Bunker Hill Mine was in operation, 1991 – to over a million dollars in 2000. | Since EPA assumed operation there has been significant repair and maintenance work needed at the plant, and more such work is required as described in Appendix E of the RI/FS. 1991 treatment costs are not directly comparable to present costs because the mine was shut down in January 1991. During 1991 mine pool pumping ceased, and upper country mine flows were diverted into the pool. Thus, there was considerable less water existing the Kellogg Tunnel compared to current conditions. |
| 1.32 | Unidentified Speaker<br>Transcript (Page 40, Line 11) | A definition of what constitutes a dissolved metal was requested. | The Idaho water quality criteria for metals are established for the "dissolved" portion of the sample, defined as the portion passing through a 0.45 micron filter. This filtration technique is the standard method used in criteria development, ambient sampling programs, and permitting programs under the Clean Water Act. |
| 1.33 | Unidentified Speaker<br>Transcript (Page 47, Line 20) | a) The speaker asked if the standards for each metal and where they came from, and if the amount of discharge that the Bunker Hill Mine is putting out, were in the RI/FS.<br><br>b) The speaker had questions regarding how average flow and concentrations were arrived at for the presentation and if a method of weighting might not be more appropriate. | a) The information is in Section 2 of the RI/FS.<br><br>b) For the public meeting presentation the mine water concentrations were determined from samples collected from the Kellogg Tunnel during the 1998/1999 monitoring program. In the event a metal was reported as not detected or was detected below the quantification limit (the concentration that the laboratory instrument is able to accurately detect), one half of the detection limit was used as the concentration. For each metal, the concentrations of the samples were summed and divided by the number of samples to determine the Average Raw AMD concentration for that metal. Averages were used because it was not the intent of the presentation to evaluate flow-weighted concentrations. Averages were appropriate for the presentation given the time available and the general overview of the mine water problem being presented. |

## 2. Comments regarding Sludge Management

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| 2.1 | Coeur d'Alene Tribe<br>(May 18, 2001) | The Tribe is very concerned about depositing and storing the sludge on the CIA, even with a liner/effluent recycling system. The CIA complex is currently the largest contributor of zinc (groundwater and surface water seepage) to the South Fork. There is no assurance that the current CIA seepage and contamination will cease after the final caps are in place. Adding more metals in the form of sludge to this mess may not be the way to go. If the sludge storage area containment fails, we have just that much more metals pollution to contend with in the river. We prefer Option D with sludge disposal beds located on site above the smelter closure area rather than permanent storage on the CIA. | New sludge impoundments can be constructed in a way that would not jeopardize the existing cover system. While failure of the liner and cover system of the new sludge impoundments is possible, it is very unlikely. The construction methods and materials are fairly standard and have been successfully used at many other sites. In the highly unlikely event that the lined system did fail, the amount of water moving into the CIA would be significantly less than current conditions (42 gpm currently, 12 gpm after high-density sludge treatment). Also, the water which would drain from the high-density sludge is expected to be of good quality because the metals are precipitated as solids, and the solids are filtered out in the drain system below the sludge. |
| 2.2 | Coeur d'Alene Tribe<br>(May 18, 2001) | The discussion at the 5/10 meeting seemed to infer that any long-term disposal outside of the CIA complex would require hauling to distant, high-cost sites such as Arlington, Oregon. This seems to contradict your own Option D discussed above. I don't understand why long-hauling of this sludge out of the Basin is being discussed or considered at all. If the material is not a hazardous waste and is Bevill-exempt, there should be no problem designing a permanent repository in the Basin as described in Option D. What did we miss here? | The RI/FS looked at regionally existing disposal areas, which included the Graham Road facility near Spokane, WA.. The objective was to provide an order of magnitude cost estimate, not to predict exact disposal costs, since the specific off-site location is not known. The disposal cost shown is an average of the cost for three different facilities. Siting and constructing a sludge disposal bed in the smelter closure area would result in much higher costs than on the CIA . This significant cost would be realized in design, construction, handling, and hauling of sludge to the new facility. Also, placement of the sludge disposal bed on top of the CIA will eliminate impacts on the community in the form of increased truck traffic along McKinley Avenue, and allow other development behind the smelter closure area, such as the proposed golf course. |

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| 2.3 | Unidentified Speaker<br>July 31, 2001 Public Meeting<br>Transcript (Pg. 26 Line 20) | a) What is the difference between the high- and low-density sludge treatment?<br>b) What sort of changes will be required to the CTP for high-density sludge treatment?<br>c) Is there an economic use for the sludge given its high zinc concentrations? | a) The treatment difference is the amount of sludge recycled within the plant and inventoried in the sludge thickener. High density sludge (HDS) treatment has much higher recycle and inventory than low density sludge (LDS) treatment. In LDS mode, the plant produces a waste sludge of about 1-5 percent solids by weight. In high-density sludge (HDS) mode, the waste sludge is about 20-25 percent solids. The HDS is expected to dewater to about one-half to one-third the final sludge volume of LDS. This significantly reduces disposal area and cost.<br>b) The CTP was constructed in 1974 and configured as an HDS plant. The plant is currently operating in LDS mode because it does not have filters. Filters are required in HDS mode to remove suspended solids from the effluent. In order to operate the CTP in HDS mode, tri-media filters will need to be added to the process. This addition will also allow the CTP effluent to meet TMDL and State of Idaho discharge limits.<br>c) The HDS produced will have a concentration of about 20 percent zinc on a dry weight basis. The treatment plant is designed to produce a sludge which dewaters well and reduces the disposal volume. These properties would likely help any future metal recovery process since the sludge will have less water in it. There is no known way to easily recover the metals in the sludge. A process was developed by University of Idaho researchers, but the process was only tested at the laboratory scale. t was a difficult process that was never demonstrated to be cost-effective. However, the sludge will be accessible in its contained disposal beds if the technology to remove metals in a cost-effective manner becomes available in the future. |
| 2.4 | Unidentified Speaker<br>July 31, 2001 Public Meeting<br>Transcript (Pg. 31 Line 18) | a) How much of the retention areas have been lined and are lined?<br>b) What is the contribution of run off from the sludge on the CIA to the river?<br>c) Is the contribution from the CIA because it is open or because it is coming off the sludge? | a) The current unlined sludge pond is about five acres in size. The current sludge pond is the only remaining uncapped portion of the CIA.<br>b) An average of about 30 gpm drains or evaporates from the unlined sludge pond. Using an average precipitation rate of 33 inches, and assuming no losses to evaporation (although evaporation does occur) , about 8.5 gpm infiltrates due to precipitation. The combined drainage from the sludge and precipitation assuming no evaporation is about 42 gpm. Conversion to HDS will reduce the amount drained from the sludge to about 3 gpm, and the total including precipitation with no evaporation to about 12 gpm, a total reduction of about 3.5 times.<br>c) Currently on average the contribution from the sludge area is about 42 gpm. About 30 gpm comes off the sludge and 8.5 gpm is due to it being open to precipitation. |
| 2.5 | Ron Roizen, Ph.D.<br>(September 17, 2001) | Dr. Roizen questions why Alternative 1 is not O&M of the existing CTP and the selection of one of the proposed sludge management alternatives? It is true that sludge management has to be addressed regardless of what alternative is selected. | Yes, it is true that sludge management has to be addressed regardless of which alternative is selected. See also responses to 1.25, 1.26 and 1.27 above for further information regarding Alternative 1. |

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### 3. Comments regarding AMD Mitigations

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| 3.1 | Spokane Tribe of Indians<br><br>(August 8, 2001) | a) University of Idaho researchers have pointed out that the Flood Stanly Ore Body should be the target of future mitigation. Without such mitigations, EPA will be converting a relatively small amount of concentrated mass from the orebody to a large volume of lime-diluted mass that will need to be disposed of in a costly engineered facility. All of this will occur via solution mining the FSOB (Flood-Stanly Ore Body) inefficiently.<br><br>b) Even though the mitigative measures are incidental to this RI/FS, future workers who will focus on minimizing load reductions exiting the mine (CTP head) in order to reduce long-term O&M costs could benefit by having the "mine water team" develop a more concise conceptual model of flow, release, transport, and fate for inclusion in this document. A conceptual model of mine-scale flow should address the hierarchy of hydraulic conductivity formed by: (1) solid-phase, (2) primary porosity of the rock mass, (3) secondary porosity formed by fractures intersecting the first two tiers, (4) tertiary porosity formed by faults that intersect the previous tiers, and (5) quaternary porosity formed by large continuous features such as mine openings that intersect all or portions of the previous tiers. The steady-state and transient nature of perceived saturation status of each block of rock mass or tier should be described conceptually. Diffusion limited releases or transport from tiers 1 through 3 or 4 as well as kinetically rapid releases of dissolved ARD-related salts through tier 5 as a function of saturation also should be described. | a) The purpose of the mitigations are to reduce infiltration of water into the FSOB. By reducing the amount of water infiltration into the FSOB, a lower overall flow of water through the FSOB can be obtained. This will result in a smaller amount of water coming into contact with the sulfide minerals that produce AMD because a smaller quantity of water would be confined to a smaller area of the original infiltration pathway. Due to the work of the diversions, water that would have originally infiltrated through the FSOB will now be diverted around, particularly high flows associated with the West Fork of Milo Creek. This will reduce the poor quality/high quantity AMD resulting from water associated with high precipitation/snow-melt events infiltrating through the FSOB and coming into contact with sulfides along the infiltration and in-mine flow paths, and is expected to reduce the flushing of reaction salts and pooled acid water. The end result will be a lowered flow that does not experience the periodic peak flows with high dissolved metal concentrations observed in the past.<br><br>b) The current understanding of mine-scale, hierarchical hydraulic conductivity is presented and developed in several theses or dissertations from the University of Idaho, College of Mines. The development is contained in the following documents:<br><br>Haskell, 1987.<br>Lachmar, 1988,<br>Whitbread, 1989,<br>Levens, 1990, and<br>Demuth, 1991.<br><br>The integration of these documents was included in the development of the mine-scale conceptual model. No additional development of the relative importance of the various tiers was undertaken in the RI/FS, because the effectiveness of flow reduction will be evaluated by field monitoring. |
| 3.2 | Spokane Tribe of Indians<br><br>(August 8, 2001) | a) As pointed out in the RI/FS the Flood Stanly Ore Body (FSOB) has been identified by numerous investigators as the dominating source for a majority of the COCs. Most previous investigations have concluded that reducing recharge to the FSOB via grouting or via infiltration control measures might reduce loads issuing to the mine pool from the FSOB by isolating the FSOB from recharging waters and keeping the source "high and dry."<br><br>b) Historically, grouting has been used in open-pit, underground mining, tunneling and other applications to "keep water out" or away from working areas. Adversaries to grouting in this type of application claim that flow cannot be controlled in a cost-effective manner. We have heard technical analogies between grouting and fixing an old rotten garden hose: "you can patch the hose, but shortly a leak will develop elsewhere." In many instances we agree with the critics. However, grouting can be very effective in changing and maintaining the degree of saturation of a rock mass by "keeping water in." Forming or enhancing reducing conditions in the FSOB by increasing the degree of saturation could be an attractive future mitigative measure. Grouting and/or diverting clean (or carbon-rich) recharge water into the FSOB could be a mitigative option that should be explored in the future. | a) It is the intent of the mitigations suggested in the RI/FS to reduce recharge to the FSOB via infiltration control measures. The phased implementation/effectiveness monitoring approach will allow experience gained through initial efforts to assist with evaluating the effectiveness and cost of future efforts.<br><br>b) While grouting may be an option to "keep water in," that is workable in several areas, it does not fit well with conditions observed in the FSOB. The FSOB is highly fractured and has much larger openings associated with tunneling and block-cave mining (Guy Caves area). In order to grout an area under these conditions would require a much more significant investment of capital and would require a high degree of O&M. Given the geology of the area and past mining practices, a grout curtain around the FSOB would be very costly and likely be of little effectiveness. Also, keeping water in would have a significant effect on mine operations currently and in the future. However, as more is learned about the FSOB, new information may allow reconsideration of grouting/flooding/or backfill mitigative measures. The phased implementation/effectiveness monitoring approach will allow experience gained through initial mitigative efforts to assist with evaluating the effectiveness and cost of future efforts. |

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| 3.3 | Spokane Tribe of Indians<br>(August 8, 2001) | Section 3.2.3; "Mitigation Effectiveness": Mitigation effectiveness is inappropriately defined by the RI/FS as: (1) a reduction of volume of water flowing through the mine or (2) improving water quality. Although reduction in treatment volume may be attractive from a WTP sizing and mine pool pumping perspective, the volume of sludge is affected by chemical load of the WTP feed – not volume of water. Sometimes sustained increases in mine inflow can be used beneficially to dilute small but concentrated flows or to increase the degree of saturation of in-place ore or gob fills. | The definition of mitigation effectiveness provided in the RI/FS is appropriate. Less water and/or improved water quality results in less effort required to manage the mine water. The mine water must be collection within the mine and directed out the Kellogg Tunnel, conveyed into storage or to the CTP, treated to meet applicable criteria, and then the resulting treatment residual (sludge) must be managed.<br><br>It is agreed that the sludge quantity is a function of chemical load. Sustained increases in mine flows which dilute the more concentrated AMD flows will not reduce the amount of sludge generated, but will make mine water management more difficult and costly. Temporary saturation of in-place ore or gob fills is expected to increase the amount of sludge generated, since the wetting/drying cycle produces reaction salts that are liberated upon the next wetting/drying cycle. A more effective mitigative approach is to prevent or reduce the temporary saturation in the first place—which is the objective of the West Fork Milo Creek mitigations described in the RI/FS. |
| 3.4 | Spokane Tribe of Indians<br>(August 8, 2001) | Appendix B; Section 1.0 "Introduction"; Page B-2; The "basic tenet" of reducing flow through the FSOB is not supported. | The basic tenet of reducing flow through the FSOB is clearly supported. Water from Milo Creek that is diverted will not come into contact with the FSOB resulting in less AMD to manage, and more clean water entering the South Fork. The use of infiltration control measures will reduce the seasonal flooding/flushing of the FSOB with infiltrating water. |
| 3.5 | Spokane Tribe of Indians<br>(August 8, 2001) | Appendix B; Section 3.3 "Water Flow in the Mine"; 1st Full Paragraph 2; Page B-8; rationale used to support the salt dissolution business is not clear. Using temperature data in a mine site in which mine ventilation plays an important role in temperature distribution is questionable. For example, some of the warm areas of the mine in the winter time are in the exhaust areas located near the Cherry Raise, Guy Cave area, and the Homestake Adit. | Average water temperatures within the mine are controlled more by the temperature of the rock and chemical reactions than the temperature of the air moving through the mine openings. Thus, the water temperature data provide interesting insight with respect to the AMD generation. |
| 3.6 | Spokane Tribe of Indians<br>(August 8, 2001) | Appendix B; Section 4.2 "Relationships to Mine Workings and Water Flow Patterns"; 1st Full Paragraph 2; Page B-10; If previous investigators could indeed measure flows from the FSOB, it would seem that such flows could be segregated for direct treatment, reducing the need to treat large volumes. Please explain.<br><br>Again, this reduction in flow to the FSOB could decrease saturation within the FSOB, which in turn could produce even poorer-quality AMD (i.e., could end up with 5 percent of the flow being responsible for 90 percent of the metal load. | A reduction in recharge to and around the FSOB should reduce the quantity of metal that is mobilized, because a smaller quantity of water would be confined to a smaller area of the original infiltration water flow path. Separate collection of the high-strength flows has been considered, and may be reconsidered as part of the phased mitigation approach. The first action to take is to try and reduce the flows—especially the peak flows. Considerations for separate collection of the high-strength flows are implementability, effectiveness, and cost. The flows are located about 12,000 feet from the KT. Collection would require considerable expense and high O&M given the propensity for muck clogging the collection areas and pipeline. Separate collection of these flows would not reduce treatment costs or the amount of sludge generated, since the same treatment load would be present, and the total flow requiring treatment would not be reduced.<br><br>The reduction of flow to the FSOB is hoped to decrease the periodic wetting/flushing. Inundated areas within the ore body are likely very few as determined from the reconnaissance efforts conducted during the RI/FS. Rather, flow through the ore body appears to be confined to relatively consistent and confined flow paths. |

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| 3.7 | Spokane Tribe of Indians<br>(August 8, 2001) | Table 2. Alts 2-5 appear to be arranged along a continuum of exuberantly anticipated performance of mitigation measures. The only differences between alternatives 2 through 5 are essentially the capital costs and monitoring associated with mitigation measures. Alt. 2 appears to be the worst case scenario in the event all mitigation measures fail (i.e., Alt. 5 without expenditures for the risky, unproven mitigation measures). The approach described in Alt. 5 of blindly applying mitigation measures without monitoring performance of the measures is not prudent. Also, Alt. 5 artificially limiting CTP head to 2,500 gpm forever is unfounded. | One of the main considerations for development of alternatives (refer to Section 4.1 and 4.2 of the RI/FS) was the relationship between degree of AMD mitigation and treatment plant size. Alternatives were developed which contained a range of mitigations and treatment plant sizes for comparison. Alternative 2 is designed to meet treatment needs for Bunker Hill Mine Water should no mitigations be performed. Alternative 2 is not designed to be the answer to failed mitigation efforts, since it does not include any mitigation efforts. Alternative 3 starts with a few selected mitigation efforts and 2,500 gpm treatment capacity and uses monitoring to help assess if additional mitigations or treatment capacity is needed. Alternative 4 is designed along the same lines as Alternative 3 but with more initial mitigation efforts. Alternative 5 is the employment of all mitigation efforts selected during the RI/FS, and a 2,500 gpm treatment plant. Mitigation effectiveness monitoring for Alternative 5 is included for up to 5 years—with the exception that in-mine monitoring is not conducted (refer to RI/FS table 5-9 for a summary) because there would be no potential for additional mitigations (i.e. the phasing approach of Alternatives 3 and 4 is not used). Alternative 3 was selected because it best balances the alternative evaluation criteria (9 criteria). Alternative 3 initially includes three mitigations that will be monitored for effectiveness. After the effectiveness of the initial mitigations and CTP capacity has been evaluated, the need for other mitigations or CTP capacity will be considered. |
| 3.8 | Spokane Tribe of Indians<br>(August 8, 2001) | Table 3: Even though the Plan (as well as the RI/FS) describes in several places the enormous uncertainties associated with the performance of proposed measures to mitigate quality and quantity of AMD CTP head, judging from the summary of costs, it appears that the Plan assumes that all mitigation measures are 100% effective. We suggest using ranges of values for each item (row) within each category (column). | In Section 4.2.1 of the RI/FS the mitigation effectiveness is evaluated on a range of values used for the TMDL Computer Model. The ranges of effectiveness given as percentages are shown in Table 4-3 of the RI/FS. The mitigations are not assumed to be 100% effective for the Table 3 costs of the Proposed Plan. Alternative 2 does not conation any mitigations, hence there are no mitigation effectiveness assumptions. Alternatives 3 and 4 assume an average of 10% reduction in lime costs and sludge generation. Alternative 5 assumes an average of 20% reduction in lime costs and sludge generation. Appendix G of the RI/FS provides a detailed accounting of the estimated cost for each alternative. |
| 3.9 | (b) (6)<br>July 31, 2001 Public Meeting<br>Transcript (Page 56, Line 14) | a) (b) (6) stated that the bacteria were the integral part of the reaction that produces AMD and that treatment should be focused on killing the bacteria to make the problem go away.<br><br>b) (b) (6) stated that a drain tunnel is a traditional approach to intercept water underground before it reaches the mine and that it could be installed relatively easily.<br><br>c) (b) (6) felt that the use of pounds per day of contaminant was misleading when we use micrograms per liter for analytical samples. He feels that kilograms per day should be used to maintain units. He added that since pounds per day results in a larger number than kilograms per day that it was being used for shock value and to mislead the public. | a) Along with the bacteria, the presence of water, oxygen, and sulfide minerals are the key ingredients to the production of AMD. Methods currently exist to remove water or oxygen from the process, but both methods were removed from further evaluation due to implementability, effectiveness, cost, or their impacts on mining activities in the Bunker Hill Mine. There is currently no technically feasible method of removing or killing all the bacteria that catalyze AMD production. If in the future this technology becomes available it would be considered not only at Bunker Hill, but likely at AMD producing mines around the world.<br><br>b) Due to the caving that has occurred in the Flood-Stanly Ore Body the area is very fractured and porous. The Bunker Hill Company built the Phil Sheridan Diversion system, which was intended to be a sub-surface water intercept system around the ore body. Unfortunately this does not intercept all the water. Surface water from West Fork Milo Creek is entering directly into the caved area and not being diverted by the Phil Sheridan system. The best solution appears to be reduction of the amount of water that enters via this known pathway—which is the intent of the West Fork Milo Creek mitigations described in the RI/FS document.<br><br>c) Loading is represented in pounds per day to maintain consistency with water quality standards such as TMDLs and NPDES discharge permits, which are written in this manner. In the United States, pounds per day units are the recognized units for loading. There was no intention to mislead the public by representing loading in pounds per day. |
| 3.10 | Ron Roizen, Ph.D.<br>(September 17, 2001) | Dr. Roizen questions how the effectiveness of mitigations can be estimated when the actual effects of peak flows on COC loading is not fully described in the RI/FS. | Section 2.3.4 of the RI/FS specifically discusses the effects of peak flows on COC concentrations. Flow increase in the mine significantly increases the acid and metal load discharging from the mine. This has been especially evident historically near the Flood-Stanly Ore Body measurement locations because these areas produce the most acidic mine water measured in the mine. |

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### 4. Comments regarding AMD Storage

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| 4.1 | Washington Dept. of Ecology<br>(August 9, 2001) | There is a possibility that the mine workings could potentially serve as temporary storage for extracted groundwater. Has the proposed plan contemplated this potential linkage to future groundwater remediation? | The Proposed Plan for the Bunker Hill Mine Water does not consider future site groundwater remediation. Use of in-mine storage for extracted groundwater was not evaluated. |
| 4.2 | Spokane Tribe of Indians<br>(August 8, 2001) | The major problem identified in Bullet No. 4 in the Summary of the Problem, "No long-term plan exists for control and management of the mine water" has not been adequately addressed by the RI/FS. Static long-term mine water management conditions are assumed in the Remedial Action Objectives and elsewhere. Costs associated with the inevitable transfer of these duties to the EPA or the State of Idaho should be discussed and included in all cost estimates. | The ROD Amendment identifies the plan (selected remedy) for long-term management and treatment of acid mine drainage from the Bunker Hill mine. The activities and costs identified in the RI/FS, upon which the ROD Amendment is based, were developed without regard to who would be performing the remedial actions. Some of the costs, e.g., AMD treatment and conveyance, are based upon actual expenditures currently incurred by the government. Others, e.g., AMD collection, are based on estimates of costs for activities currently undertaken by the mine owner. We are not aware of any specific costs associated with the transfer of activities to EPA or the State of Idaho. Also, EPA and IDEQ do not agree with the commentor's statement regarding the inevitable transfer of duties to the EPA or the State of Idaho. As indicated in Section 6.3 of the ROD Amendment, government operation of the CTP was assumed out of necessity, not desire, when the former owner/operator went bankrupt. EPA and IDEQ believe that ownership and operation of both the mine and the CTP most appropriately belong in the hands of private business. |
| 4.3 | Mr. Robert Hopper<br>(September 14, 2001) | a) Please explain, in detail, what is involved in the "New In-Mine Gravity Diversion System," and the "New Mine Pool Extraction System," that is listed with a total capital expense of $1,950,000.<br>b) How is this work expected to be accomplished without total disruption to existing mining operations?<br>c) How long is this work expected to take from beginning to completion? | a) Both items are discussed in detail in Section 3.4 and Appendix D of the RI/FS, and detailed costs are provided in Appendix G of the RI/FS.<br>The New In-Mine Gravity Diversion System would replace the existing system for diverting mine water into the mine pool. The existing system requires the use of electrical pumps to divert the water. If there is a power failure when the CTP is down, it could result in a release of raw AMD into the South fork. The new system is a gravity diversion system using gates to divert the ditch flows into the mine pool. One diversion is needed for the east-side water, and one is needed for the west-side water. East-side water would be diverted down a pipe installed in Raise #2, and the west-side water down a pipe installed in a newly constructed raise, or through an existing raise or transfer chute in the vicinity of the Barney Drift. The gravity system could operate manually if needed, and could be sized for high glows. Such a system could also be configured using overflow weirs to allow passive diversion of flows in excess of the CTP's capacity.<br>Upgrades to the existing mine pool dewatering system are needed to pump diverted water back up from storage in a timely manner. The conceptual design for the new pumping system would use two 700-gpm submersible vertical turbine pumps. Two pumps would provide the capacity needed to pump both the steady-state and diverted water from the mine pool. Two pumps would also provide an installed spare for steady-state pumping if one pump required maintenance. Both pumps would be installed below the 11 Level and could pump water directly to the 9 Level without additional booster pumps. The current electrical system in the mine would be upgraded to accommodate the pumps.<br>b) Close coordination with mine operations would be required to accomplish the work. Specific installation procedures will need to be developed with the NBHMC.<br>c) A schedule for the work has not been developed. Items that would affect the schedule include the specific design details (which have not been developed), scheduling with the NBHMC, and the role that the NBHMC would play in the design and construction. |

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| 4.4 | (b) (6) | a) Can you please tell me how you arrived at the cost basis for mine operation?<br>b) Can you tell me why you deem it necessary to make mine operation costs part of your mine water management plan? | a) A cost for mine operation was not developed in the RI/FS document. Costs for collection of the mine water were developed. All costs in the RI/FS document are estimated costs—as required by RI/FS development guidance. Section 3.3 of the RI/FS describes two collection options, with one being continued use of the existing approach of pumping the mine pool and gravity discharge of the upper country waters. The existing collection approach requires portions of the mine to be maintained for access and operation of the collection equipment. Appendix G of the RI/FS provides a cost estimate for the exiting approach. The total estimated cost is $1,070,992 per year. The cost estimate sheet in the appendix breaks the cost estimate down into labor, power, and other categories, which had a subtotal of $823,840. A 15% contingency for repairs and maintenance was added ($123, 576) and a 15% allowance for unaccounted costs was added ($123,576).<br>b) As described above in a), mine operation costs were not included in the RI/FS document. An estimated annual cost for maintaining the existing AMD collection approach were developed. |

## 5. Comments Regarding TMDLs

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| 5.1 | Mr. Robert Hopper<br>(September 14, 2001) | On Thursday, September 5, 2001, the District Court threw out the new TMDLs.<br>a) How does this affect the Bunker Hill RI/FS?<br>b) If the answer to (a) is that it does not affect the RI/FS, then explain why not. | Please see the response to comment 1.13 above for a discussion of the TMDL released by EPA and DEQ in August 2000, a recent state court decision regarding the TMDL, and any impacts on the mine water RI/FS. |
| 5.2 | Spokane Tribe of Indians<br>(August 8, 2001) | Section 4.2.1; "TMDL Computer Model Overview": According to the discussion on how discharge limits are determined (see also Figure 4-1), it appears that the load already existing in the SFCDR is not considered. In many instances the existing load already exceeds the TMDL. Table 4-2 also indicates that the variability in upstream loads is not accounted for. Please clarify this point. | The model was used to evaluate options for meeting CTP applicable discharge criteria. It was not intended to address upstream sources or the existing river load. The load already existing in the SFCDR was therefore not considered, nor was the variability in upstream loads. |

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| 5.3 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Section 4.1; "Introduction to Evaluation Criteria": The goal for all of the proposed alternatives is to achieve the TMDL defined in 2001. However, as stated elsewhere herein, the TMDL is not protective of human health of downstream interests such as the Spokane and Coeur d'Alene Tribes. Therefore, as written, these alternatives fail the NCP threshold criteria. | Potential human health exposures and risks associated with traditional or modern subsistence lifestyles specific to the Coeur d'Alene or Spokane Tribes were not considered in the development of the TMDL. Potential Coeur d'Alene Tribe subsistence scenarios were assessed for the Lower Basin in the HHRA for the Coeur d'Alene Basin (TerraGraphics et al, 2001). These analyses concluded that for non-lead metals, *" Risks and hazards for the traditional subsistence scenario were the highest of any receptor population. Cancer risks for both the modern and traditional exposure scenarios were greater than 10-6."* For lead, *"Native American subsistence practices in the Lower Coeur d'Alene Basin would be ill-advised. Soil and sediment ingestion rates associated with residences in the flood plain and food harvest practices are extremely high. Near background level concentrations would be required to achieve acceptable intake rates for soils and sediments. Additionally, two critical elements of the native diet, fish and water potatoes, contain unsafe levels of lead when aboriginal consumption rates are applied. Lead levels in these food sources may also likely need to be in equilibrium with background soil and water conditions to assure acceptable intake rates."* The applicability of these findings to the Spokane Tribe or Spokane Tribal reservation or ancestral lands was not evaluated.<br><br>The Spokane Tribe identified nine beach locations along the Lake Roosevelt arm of the Spokane River which were sampled by EPA in 1999. In these locations, levels of lead and arsenic did not differ significantly from anticipated natural levels of these metals. The highest levels for lead and arsenic were 20 and 16 mg/kg, respectively. As part of the Model Toxics Control Act, the Washington Department of Ecology has established natural background levels for lead and arsenic in the Spokane Area of 16 and 10, respectively. In the Silver Valley, 90$^{th}$ percentile natural levels of lead and arsenic are 170 and 22, respectively (Gott & Cathrall, 1980).<br><br>References:<br><br>Gott, G. & Cathrall, J. (1980). Geochemical-Exploration Studies in the Coeur d'Alene District, Idaho and Montana pp. 40. United States Department of the Interior. Washington, D.C. |
| 5.4 | Ron Roizen, Ph.D.<br><br>(September 17, 2001) | Dr. Roizen suggests that there is no relationship between the ARAR concept and TMDLs. | Please see Section 5.2 of the ROD Amendment [Key Applicable or Relevant and Appropriate Requirements (ARARs), To Be Considered (TBC) Guidance, and Remediation Goals] for a discussion regarding ARARs, TBCs, and the August 2000 TMDL document. |
| 5.5 | Ron Roizen, Ph.D.<br><br>(September 17, 2001) | Dr. Roizen states that the nullification of the TMDLs by the court requires not only a full review of the TMDLs to consider background levels for the Basin, but also full review of the mine water management plan. He states that the TMDLs were the driver behind the need for the plan and since they are no longer in effect, there is no need to reevaluate a treatment process that was deemed acceptable in the 1992 ROD. | Please see the response to comment 1.13 above for a discussion of the TMDL released by EPA and DEQ in August 2000, a recent state court decision regarding the TMDL, and any impacts on the mine water RI/FS. In addition, EPA notes that the 1992 ROD called for use of the existing CTP as a pretreatment step prior to further treatment of acid mine drainage in a wetlands treatment system. Based on treatability studies, the wetlands treatment system was found to be incapable of meeting treatment levels. |

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| 5.6 | (b) (6) | As I see it, the Bunker Hill Mine…water runs into the mine from various sources (the water is not generated by the mine) and through our ditch system, out of the KT (Kellogg Tunnel), and on to the CTP. The TMDLs the EPA/DEQ reference are not on the water until it is discharged into the river. That means the TMDL responsibility is the treatment plant's not the mine's…so why does EPA/DEQ/ACOE so arrogantly think they should manage the mine water before it reaches their jurisdiction? | There are no other acid producing sources from the hillsides above the mine. The acid is generated within the mine. Fault zones in the upper Milo Creek watershed and the close proximity of the extensive mine workings particularly in the West Fork of Milo Creek result in significant surface water infiltration into the mine workings. This clean surface water is then changed through chemical reaction with pyrite and oxygen to acid mine drainage that eventually requires treatment at the CTP.<br><br>The acid mine drainage that flows out of the Kellogg Tunnel is the responsibility of the Mine. It has been the responsibility of the Mine at least since the Bunker Hill Company built the Central Treatment Plant in 1974 to treat the mine water. The United States is the current operator of the Central Treatment Plant only because of the bankruptcy of the Bunker Limited Partnership. By operating the Central Treatment Plant, the United States is providing a service to the Mine, which the Mine owner is obligated to pay for. By treating the mine water, EPA provides a benefit to the New Bunker Hill Mining Company that no other mining company in the Valley receives. The Mine owner is currently extremely delinquent in paying for this service. Despite this delinquency, the United States will continue to treat the mine water in order to protect human health and the environment from the effects of the discharge of untreated mine water and it will seek access to the mine for the sole purpose of improving the efficiency of the Central Treatment Plant through AMD mitigation, collection, storage, and monitoring efforts. |
| 5.7 | Unidentified Speaker<br><br>Transcript (Page 49, Line 20) | a) The speaker asked for a comparison between discharges coming from the Bunker Hill Mine and other mines such as the Lucky Friday, Galena, and Sunshine mines.<br><br>b) The speaker also asked whether the TMDLs were the same for each.<br><br>c) For example, what is the zinc TMDL for the Lucky Friday or Galena mine compared to Bunker Hill. | a) The Bunker Hill Mine discharges are generally more acidic, have higher metals concentrations, and have higher flow. The attached Table 1 lists the relative flows from their outfalls.<br><br>b) See Response to Comment 1.10.<br><br>c) Table 1 (attached) provides a comparison between the wasteload allocations for the CTP and the other mines. Also see Response to Comment 1.10. |
| 5.8 | (b) (6)<br><br>Transcript (Page 55, Line 15) | (b) (6) stated that he felt that other mining companies were being held to a higher standard than Bunker Hill and that this is not fair. | See response to Comment 1.10. |

## 6. Comments regarding the Baseline Risk Assessment

| Comment Number | Received From | Comment | Response |
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| 6.1 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Effluent standards or "goals" described in Table 2-3 (page 2-49) as TMDLs are not protective of those who rely on natural resources for subsistence purposes (let alone medicinal and spiritual uses of natural resources). The Idaho standards purported to be protective of residents of Idaho are highly questionable. Calculation of some of these values are based on an urban human health risk scenario and are therefore inapplicable for this region. The use of the old NPDWQS for concentration of arsenic protective of human health also is questionable (CTR employs a value of 0.018 $\mu$g/L to be protective at a $1 \times 10^{-6}$ risk level). | See Response to Comment 5.3. |
| 6.2 | Spokane Tribe of Indians<br><br>(August 8, 2001) | Section 2.5.2.5; "Potentially Exposed Populations"; Human Population Subheading; Page 2-29: Considering the persistence of the COCs and the estimated duration of cleanup, this section also should consider potential future exposures. In order to do this, reasonably foreseeable land uses should be determined or estimated. | As indicated in the 1992 ROD, land use within the Bunker Hill Superfund site includes a mix of residential, commercial, mining, and light industrial activities. There are no changes in land use expected as a result of the ROD Amendment. Current and potential future exposures to treated and untreated acid mine drainage were identified in the RI/FS. |

| Comment Number | Received From | Comment | Response |
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| 6.3 | Spokane Tribe of Indians<br><br>(August 8, 2001) | a) Page 6; "Summary of Risks": As discussed in voluminous comments to EPA regarding HHRA in OU4, like determination of the NAWQS (used to set the TMDL), the baseline screening level human health risk assessment (BSLHHRA) does not describe risks to those that use the resources of the Basin for subsistence, religious, or cultural purposes. This means that the TMDLs are not necessarily protective of human health for a significant portion of human receptors.<br><br>b) Therefore, statements such as "Aquatic resources within downstream water bodies represent the species most sensitive to contaminants" are false and should be reconsidered (receptors such as humans who consume large quantities of slightly contaminated resources are more sensitive to contamination). | See Response to Comment 5.3. |
| 6.4 | Ron Roizen<br><br>(September 17, 2001) | Dr. Roizen states that no evidence is given that current CTP effluent concentrations pose a risk to human health and the environment. | Acceptable limits of metals concentrations in CTP effluent are defined by the State of Idaho water quality standards and federal water quality criteria. These standards and criteria were developed to be protective of aquatic organisms and human health. As identified in the RI/FS, untreated acid mine drainage exceeds protective water quality standards by up to 2,200 times. See also response to comment 1.11 above. |
| 6.5 | (b) (6)<br><br>Transcript (Page 55, Line 15) | (b) (6) also stated that on July 26, 2001 he caught five fish on six casts at the mouth of the South Fork. | Fish populations are relatively healthy in the reaches of the South Fork below Pinehurst in comparison to other areas of the river. High water hardness conditions present below Smelterville lessen the toxic effects of metals in the downstream reaches of the river to a certain degree (the presence of dissolved organics in this area may also help), and some movement of fish into the mouth from the North Fork Coeur d'Alene River can be expected to occur. It is important to note that some native fish species are not represented in the South Fork despite these observations. Sculpin, native fish species that live on stream bottoms and are fed upon by large trout, are virtually absent from the South Fork downstream of Mullan. Sculpin populations are absent or greatly reduced in areas where metals contamination is present. |
| 6.6 | Unidentified Speaker<br><br>Transcript (Page 44, Line 11) | If the cleanup is being done to protect fish, why is the river full of fish.<br><br>The speaker also stated that if there was more shade along the river, the trout would return to the area. A lack of habitat and not toxic levels of metals is what appears to be keeping down fish populations in the river. The speaker stated that Marty Calabretta planted trees around Elizabeth Park and trout showed up shortly afterwards. However, she was ordered to remove the trees because they were "an attractive nuisance to fish." | Fish populations in the South Fork Coeur d'Alene River vary with location in conjunction with levels of metals contamination and physical habitat conditions. The fish community above Mullan is generally healthy and is dominated by native species. The fish population declines steadily on a downstream gradient, with sculpin disappearing as soon as metals concentrations rise above ambient water quality criteria (AWQC). AWQC are the regulatory limits for protection of the aquatic environment. Fish populations from Wallace downstream through Pinehurst are greatly reduced. Metals concentrations in this stretch of the river typically range from 7x to 15x the AWQC. Fish densities are low and the resident fish are small, although conditions during high flows allow for fish migration through the area. Below Pinehurst, some recovery of the fish population occurs. This is due in part to the influx of relatively clean water from Pine Creek, and an increase in water hardness in the lower reaches of the South Fork which reduces metals toxicity (the presence of dissolved organics in this area may also help). It is important to note that the native fish community in this area is far from intact. Sculpin, native fish species that live on stream bottoms and are fed upon by large trout, are virtually absent in this area (see response to comment 6.6).<br><br>Physical habitat conditions are certainly a limiting factor for fish populations throughout the South Fork Coeur d'Alene River, an issue that is acknowledged and addressed in the Ecological Risk Assessment (EcoRA) and Feasibility Study Report for the Basinwide RI/FS. As discussed in the EcoRA, the current habitat conditions are attributable at least in part to the secondary effects of metals contamination on physical and biological components of the ecosystem. For example, riparian vegetation throughout the South Fork has been adversely affected by high levels of metals in floodplain soils. The loss of riparian vegetation and the adverse effects on instream habitat have been well documented in the Basin-wide ecological risk assessment.<br><br>Mrs. Callabretta's trees were lost to beavers, they were not ordered to be removed. |

## 7. Comments Regarding Mine Ownership and Federal and State Involvement with respect to Mine Ownership

| Comment | Received From | Comment | Response |
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**Comments Received for**
**PROPOSED PLAN FOR THE BUNKER HILL SUPERFUND SITE**
**Bunker Hill Mine Water Management**
**Kellogg, Idaho**

| Number | | | |
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| 7.1 | Coeur d'Alene Tribe<br>(May 18, 2001) | We understand that selecting the technical "fix" for the AM drainage is presently not a responsibility of the mine owner (Mr. Hopper), but when the mine closes, or when he runs out of money, or goes bankrupt, or tries to sell the property, what will be the role of the owner? Is he a PRP... will he be required to participate in some way or just walk away? If he has some financial responsibility, should he not be involved with this alternative selection? I am concerned that one day we will try to implement a selected course of action and we will be faced with opposition from Mr. Hopper on the basis that "he was not involved." Your summary states (ES-9) that coordination of the mine owner is required for alternatives 2-5. He apparently is cooperating now by allowing EPA access for water collection, etc., but what assurance is there for the future? | The New Bunker Hill Mining Company (NBHMC) was notified of its status as a potentially responsible party (PRP) at the Bunker Hill Superfund Site in March, 1997. EPA and IDEQ believe that NBHMC is responsible for the treatment of acid mine drainage from the Bunker Hill mine. Furthermore, EPA and IDEQ believe that NBHMC has a role and responsibility in implementing the selected remedy. Following issuance of the ROD Amendment, we will seek to enter into a legal agreement with NBHMC to define its role and contribution to remedy implementation. Fundamentally, EPA and IDEQ believe that ownership and operation of both the mine and the CTP most appropriately rests within the hands of a viable mining operation.<br><br>The NBHMC has been involved in the development of alternatives for long term mine water management. For example, EPA and IDEQ met with NBHMC early in the RI/FS scoping process to discuss proposed investigations. In addition, NBHMC has reviewed draft documents for comment, participated in technical meetings as the RI/FS was developed, provided access to the mine for sampling, and shared detailed technical knowledge of the mine and mining operations. Information has been shared with NBHMC regarding those elements of the selected remedy that will require close coordination. While the commentor is correct that remedy selection is a responsibility of the agency, EPA and IDEQ believe that every attempt has been made to involve the mine owner in the alternatives development process. Concerns expressed by the NBHMC were identified in the Proposed Plan and ROD Amendment (see the Community Acceptance section of the ROD Amendment, Section 6.3.9). The NBHMC has not expressed support or a preference for any particular alternative. |
| 7.2 | Spokane Tribe of Indians<br>(August 8, 2001) | Page 2; Last paragraph; "Mine History and Ownership": Even though it appears that Alternative 3 purchases pump and treatment equipment for NBHMC, it would seem that the role of the NBHMC in the remedy could influence the estimated cost of each preferred alternative. EPA's contingency plan for NBHMC's ultimate demise should be described. | The ROD Amendment identifies the technical components of the selected remedy, but does not dictate the party which will conduct work or bear the associated costs. EPA agrees that expenditures by the governments will be reduced by the amount of work conducted by the NBHMC. As indicated in the comment directly above, EPA and IDEQ will seek to reach a legal agreement with NBHMC to define its role and contribution to remedy implementation.<br><br>A mine contingency plan was developed in July 1999 by CH2M Hill for EPA and is included in the Administrative Record for this ROD Amendment (See *Mine Contingency Plan for the Bunker Hill Mine, Kellogg, Idaho, July 1999*). The contingency plan addresses operations and maintenance activities necessary to continue the collection and treatment of acid mine drainage from the Bunker Hill Mine. This plan would be implemented by EPA if the NBHMC was no longer willing or able to operate the mine water collection system. |
| 7.3 | Northwest Mining Association<br>(August 10, 2001) | The EPA proposal emphasizes the <u>need</u> for a cooperative relationship with the NBHMC, but very obviously does not have such a relationship at this time. Though EPA seems to consider this a "community acceptance" issue under Modifying Criteria, NWMA believes it is a far more critical matter. It has a great deal to do with the fundamental "Balancing Criteria" of implementability and cost. Therefore, EPA must seriously consider and describe how it will proceed if the needed cooperative relationship never materializes. The document is silent on this key issue. | EPA disagrees with the commentor that a discussion regarding the details and options for enforcement-related activities belongs in the ROD Amendment. The ROD Amendment describes the technical components of the selected remedy. It does not typically identify the party or parties who will actually conduct the work. Under the Superfund law, EPA has broad enforcement authorities. Options for proceeding with remedy implementation include: 1) EPA can perform the work using money from the Superfund program and seek reimbursement from NBHMC; 2) NBHMC can agree to perform work; or 3 ) EPA can compel NBHMC to perform the work. |

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| 7.4 | (b) (6)<br>(August 6, 2001)<br>Note: Comments are summarized | (b) (6) comments were directed at items in the Proposed Plan that would affect the Bunker Hill mine that is privately owned and a working business. (b) (6) stated that he felt that the work associated with the Proposed Plan is an attack on Mr. Hopper, the owner of the NBHMC. (b) (6) suggested that the EPA match Mr. Hopper "sample for sample – assay for assay, of the water coming out of the Bunker Hill Mine." (b) (6) also suggested the dismissal of Mary Kay Voytilla. | As discussed in response to comment 7.1 above, EPA and IDEQ believe that every attempt has been made to coordinate with NBHMC during the development of alternatives for the long term management of acid mine discharge from the Bunker Hill mine. Furthermore, as a working business, EPA and IDEQ believe that the responsibility for collection and treatment of this discharge rests with the NBHMC, not the governments and the state and federal taxpayers as has been the case since 1996.<br><br>As indicated in the Proposed Plan and ROD Amendment, ongoing operation of the Bunker Hill mine was an important consideration during the development and selection of a remedial alternative. For example, in-mine sludge disposal options were ruled out in the RI/FS which would have created an impediment to ongoing mining operations. In addition, we believe that the actions included in the selected remedy benefit the possible future full operation of the mine by providing certainty to future investors regarding mine water control and treatment. For example, present and future operations must be conducted in accordance with environmental regulations. The changes to be made at the CTP will ensure compliance with these regulations. In addition, the acid mine drainage flow reduction measures will reduce the amount of mine water and sludge generated. Less mine water and sludge generation will benefit current and potential future mine operations by reducing the costs of treatment and disposal.<br><br>In response to the commentor's final point, EPA would be happy to compare and discuss with the mine owner any differences between mine water sample results recorded by the EPA and NBHMC. EPA is not aware of any such discrepancies. |
| 7.5 | Mr. Robert Hopper<br>(September 14, 2001) | Mr. Hopper assumes that Alternative 3A is the selected alternative. He had several questions regarding this alternative.<br><br>This alternative calls for EPA to manage the Bunker Hill Mine water. Consequently, how do you foresee this operation and the current mine operation coexisting for the next 30 years?<br><br>Does the EPA/DEQ expect to force out the present owner so that their operation and management can take over?<br><br>Does the EPA/DEQ expect to compensate the present owner for the past harassment, the present and past infringement and the proposed future destruction of the mining potential?<br><br>When does the EPA/DEQ plan to start onsite management? Give exact date if possible.<br><br>What is expected of the present operations when this take over occurs?<br><br>Plans call for "demolition" of the existing pipe columns and related infrastructure. Give the date as close as possible to when this demolition is expected to occur. | As indicated in the ROD Amendment, it is not the intent or desire of EPA or IDEQ to assume the ownership or operation of the Bunker Hill mine. The selected actions are necessary to ensure the ongoing and continued treatment of acid mine drainage and will not prevent the mine from operating. As with any business that generates a waste stream, the costs of operating that business includes managing the waste stream. EPA and DEQ plan to negotiate an agreement with the mine owner that defines the extent of NBHMC's and the government's involvement in conducting and funding mine water management activities, and the parameters necessary for an ongoing working relationship between EPA and NBHMC. This agreement can consider the current and potential future financial capacity of NBHMC to the extent that such information is provided by the mine owner. Until such an agreement is reached, it is impossible to predict, as requested by the commentor, the timeframe for implementation of in-mine remedial components. |

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| 7.6 | Mr. Robert Hopper<br><br>(September 14, 2001) | The proposed alternative has what appears to be a gross oversight. For this plan to work the transportation of government and their contractors employees need to be addressed and it appears that has not been done.<br><br>For this plan to work efficiently, the operators would need at least 4 and perhaps 5 locomotives in order for it to be possible to move their people in, out, and around the mine on a daily basis.<br><br>These units will cost approximately $100,000 each. There are no funds that I can find that have been budgeted for this expense. So the following questions come to mind.<br><br>Does the government plan to use the mine's existing locomotives?<br><br>Does the government plan to use the mine's shops for service and repairs, since the government and its contractors have no shops of their own for such work?<br><br>Does the government plan to just "take" the equipment and the facilities?<br><br>Does the government plan to just take our inventory of parts and specialized equipment for their own use?<br><br>If the government decides to purchase their own transportation, how will they plan to handle service and repairs and where?<br><br>If the government plans to purchase their own transportation, where do they plan to park their equipment? | See response to comment 7.5 above. |
| 7.7 | (b) (6)<br><br>(September 4, 2001) | Your Alternative 3A, as well as all other alternatives, does not address the coexistence of your proposed operation regarding the Bunker Hill Mine and Mr. Hopper's current and future operation.<br><br>Will you address how you envision these two operations simultaneously operating.<br><br>Have provisions been made to compensate Mr. Hopper for loss of business when your operation interferes with his?<br><br>Who determines your operation is more important than his?<br><br>What criteria will be used?<br><br>What will be the final outcome of Alternative 3A? It is not clear from your presentation, if the improvement of the water quality discharged from the CTP is your only objective. I do not see Alternative 3A centrally focusing on improvements of the CTP, as a majority of the plan is dependent on the EPA's management of the Bunker Hill Mine. Are you saying the only way you can improve the water discharged from the CTP is to manage the Mine also? Have you notified Mr. Hopper of the time frame for which his operation will cease and yours will begin? | EPA disagrees with the commentor's assertion that mining operations and treatment are two separate systems for which the NBHMC is responsible for operation of the mine and the EPA is responsible for treatment of the mine's acidic discharge. As owner of the Bunker Hill mine, NBHMC is also responsible for the collection and treatment of acid mine drainage from the mine - a cost that has been borne by the governments and the federal and state taxpayers since February 1996 at approximately $1 million per year. The point seems to be missed by the commentor that for some time there has been a substantial investment by the government in the continued viability of the mining operation.<br><br>In order to have a successful business operation, both mining and treatment must coexist. It is expected that the roles and activities of NBHMC and the governments for implementing the selected remedy will be defined in a legal agreement between EPA, IDEQ, and NBHMC. As indicated in the comments above, it is not the intent or desire of EPA or IDEQ to assume the ownership or operation of the Bunker Hill mine. EPA and IDEQ are participating in this venture in the hope that the Bunker Hill mine will become an economically viable operation, and that the NBHMC or another party will take over the operation of the treatment plant thus saving tax payers dollars.<br><br>The remedial action objectives for long-term mine water management were defined in the RI/FS and Proposed Plan and are included in the ROD Amendment. One of these objectives included upgrading the CTP to meet current water quality standards and to improve its reliability and efficiency. Furthermore, acid mine drainage treatment was a component of each of the remedial alternatives. Under this component, changes to the CTP are described. Long-term management and treatment of the acid mine discharge, however, is unavoidably linked with mining operations. It is impossible to separate treatment from mining operations as suggested by the commentor. For example, maintenance of in-mine systems (including maintenance of the rail system, hoisting facilities, electrical system, ventilation system, shafts and drifts) is necessary to ensure ongoing collection of acid mine drainage and conveyance to the CTP. Also, in-mine water storage requires construction and maintenance of in-mine diversion and pumping systems, as well as an agreement to use such systems when storage capacity is needed. |

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| 7.8 | Ron Roizen, Ph.D.<br>(September 17, 2001) | The subsection on "Implementability" notes that alternatives 3-5 require access to the Bunker Hill mine's interior and "cooperation of the mine owner." This language may however be euphemistic in character – i.e., serving to cover over the actual nature of the relationship between the mine owner and the EPA. If, in fact, the mine owner would elect not to permit EPA (or DEQ) access to the interior of the mine, then one guesses that the selection of alternatives 3-5 would imply involuntary compliance on the mine owner's part. In that case, of course, it would be more accurate for the text to suggest that enforced and involuntary access to the mine's interior is a requirement of alternatives 3-5. If our American high premium on the sanctity of private property is to be transgressed by three of these alternatives, then it is best to lay out that fact frankly in the document's text. | EPA's options for proceeding with remedy implementation under the Superfund program are identified in response to comment 7.3 above. |
| 7.9 | Ron Roizen, Ph.D.<br>(September 17, 2001) | The text associated with OU-3 suggests that no plans were laid down for the mine AMD in the BHSS's 1992 ROD because the property "was under private ownership and was anticipated to remain so." If this assertion is intended to suggest that private ownership is a disincentive to EPA intervention, then of course the current (private) ownership of the mine may qualify to offer the same disincentive. | The RI/FS text referenced by the commentor states that the 1992 ROD included provisions for continued treatment of acid mine drainage at the CTP followed by further treatment in a wetlands system. No attempt was made to analyze whether private ownership is an incentive or disincentive to EPA intervention. See also the response to comment 1.28 above regarding differences between the 1992 ROD and the current ROD Amendment. |
| 7.10 | (b) (6) | You had the audacity to propose pumping sludge back into the Bunker Hill Mine, regardless of the fact that it is privately owned, and a working business… | Possible in-mine sludge storage options were identified and evaluated with input from the NBHMC in order to ensure the continued operation of the Bunker Hill mine. See also responses to comments 7.1 and 7.4 above. |
| 7.11 | (b) (6) | I am sure fabricated information, erroneous science, and false assumptions are used against Bunker Hill and Mr. Hopper to justify the conception of the management plan. | The information presented in the RI/FS and the proposed plan are considered accurate. If the commentor has information which suggests otherwise, EPA would like to review it. |
| 7.12 | (b) (6) | When was your master plan for Bunker Hill Mine conceived, and who were the initial allies? | There is no master plan. The plan that the commentor may be referring to is the July 1999 Mine Contingency Plan for the Bunker Hill Mine discussed above in response to comment 7.2. The contingency plan addresses operations and maintenance activities necessary to continue the collection and treatment of acid mine drainage from the Bunker Hill Mine in the event that the NBHMC was no longer willing or able to operate the mine water collection system. It is not a plan to operate the mine. |
| 7.13 | (b) (6) | When Mr. Hopper purchased the mineral rights did your plans change? After all, they should have. You wanted the CTP and you got it after the bankruptcy from the county, but you did not acquire the Bunker Hill Mine from the bankruptcy of BLP. Mr. Hopper did, so now you should have acknowledged a new ally in the management plan, Mr. Hopper. But of course, I know that did not happen – eventually a plan to operate the mine was developed, the plan that surfaced last year during the congressional hearings. | EPA assumed the ownership and operation of the CTP out of necessity, not desire, when the former owner/operator went bankrupt. EPA had nor has any plans or intentions to take over the Bunker Hill mine. The plan that the commentor refers to is the July 1999 Mine Contingency Plan for the Bunker Hill Mine discussed above in response to comment 7.2. The contingency plan addresses operations and maintenance activities necessary to continue the collection and treatment of acid mine drainage from the Bunker Hill Mine in the event that the NBHMC was no longer willing or able to operate the mine water collection system. It is not a plan to operate the mine. |
| 7.14 | (b) (6) | Have you offered your assistance to Mr. Hopper, as the owner of the mine, to accomplish the projects within the mine that you are planning to do in spite of him? | As indicated above in response to various comments included in this section, EPA intends to negotiate a legal agreement with NBHMC to define roles and responsibilities for implementing the various actions included in the selected remedy. |
| 7.15 | (b) (6) | What corrupt arrogant bureaucratic official would imagine you could manage any part of the Bunker Hill Mine better than Mr. Hopper? | As indicated above, EPA and DEQ do not intend to assume ownership or operation of the Bunker Hill mine. |
| 7.16 | (b) (6) | …you have confused two issues, 1. Management and operation of the Central Treatment Plant (CTP) which you own, and 2. Management and operation of the Bunker Hill Mine, which you do not own. | See response to Comment 7.7 above. |
| 7.17 | (b) (6) | …why should the Bunker Hill Mine, a private enterprise, be managed by any of you in any capacity of government? | The EPA and DEQ have conducted the RI/FS and issued the ROD Amendment not with any inclination to manage the mine, but with every hope that the Bunker Hill Mine will become economically viable and that operation of the CTP will also be undertaken by private enterprise. See also the response to comments 7.5, 7.7, 7.13, and 7.15 above. |

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| 7.18 | (b) (6) | ...in order to manage the water in the manner you propose, you would need to manage the existence of the mine. You state in your plan many intrusive actions within the mine without assisting Mr. Hopper to do what is best and without considering the impact your inappropriate actions will have on his operation. | While we believe that mining operations and treatment of the mine's acidic discharge are inextricably linked (as discussed in response to comment 7.7. above), we do not agree with the commentor's suggestion that the agencies will need to manage the existence of the mine in order to implement the actions included in the ROD Amendment. In terms of assistance to the NBHMC, the government's have already invested heavily in the Bunker Hill Mine by treating the mine's acidic discharge and maintaining the CTP, a benefit that no other mining company in the Silver Valley receives (see responses to comment 5.4 and 7.7 above). As indicated in response to various comments above in this section, EPA and DEQ plan to negotiate an agreement with the mine owner that defines the extent of NBHMC's and the government's involvement in conducting and funding future mine water management activities associated with the implementation of the ROD Amendment. With respect to the impact of remedial actions on mining operations, the alternatives contained in the RI/FS were developed with assistance from the NBHMC. The NBHMC reviewed draft documents and participated in technical discussions as the RI/FS was developed. See also the responses to comments 7.1 and 7.4 above. |
| 7.19 | (b) (6) | Many people agree with you – all mining in America should be shut down. | This opinion has not been expressed by the EPA or IDEQ. |

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## 8. Comments Regarding Public Involvement/Community Acceptance

| Comment Number | Received From | Comment | Response |
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| 8.1 | (b) (6) | You hold these public community meetings because you were forced to do so, not because you wanted my input. | Public input is important and helps shape decisions. For example, as a result of some of the comments we heard during the public comment period EPA better understands that some individuals are concerned about what they believe is an attempt on the part of the government to use the ROD Amendment as a vehicle for assuming ownership of the Bunker Hill Mine. As a result, EPA and DEQ have been able to clarify their position on this matter (see the Community Acceptance portion of the ROD Amendment found at Section 6.3.9, and the responses to comments in Section 7.0 of this Responsiveness Summary). In addition, based on input from the Bunker Hill Task Force, the liaison between the agencies and the community, both before and after release of the Proposed Plan, EPA and IDEQ were able to identify a sludge disposal approach which permits reevaluation of disposal capacity and location over time. This approach addresses comments regarding the need to coordinate the disposal efforts of various projects competing for scarce local disposal capacity and community development efforts. |
| 8.2 | (b) (6) | I have no doubt they intend to implement their management plan no matter what the public says. | Yes. EPA and IDEQ do intend to implement the ROD Amendment. Ensuring the reliable, efficient, and ongoing treatment of acid mine drainage from the Bunker Hill mine is a high priority for both agencies. Options for proceeding with remedy implementation under Superfund were identified above in response to comment 7.3. We hope to work cooperatively with the NBHMC to reach agreement on those aspects of the remedial action that they will perform and/or fund.<br><br>Public opinion on the remedial alternatives, as expressed during the public comment period and described in Section 6.3.9 of the ROD Amendment, is divided. Support for ongoing treatment of acid mine drainage and improvements to the treatment system, as well as a preference for no additional actions was expressed. As noted in the ROD Amendment, EPA is unable to satisfy the desire of the latter group by selecting a no-action alternative. Because the no-action alternative would result in the direct discharge of untreated acid mine drainage to Bunker Creek and the SFCdA River at some point in the future, and does not meet current water quality standards, it is not protective of human health and the environment and does not comply with Applicable or Relevant and Appropriate Requirements (ARARs). |
| 8.3 | (b) (6) | If our opinion mattered, why weren't we asked for comments before you spent 2 million dollars on this arrogant plan to manage something you do not own? | For this ROD Amendment, EPA followed the public participation requirements as outlined in the National Contingency Plan. EPA provided additional opportunities for general public involvement during the development of the RI/FS by providing updates to the community on the status of the RI/FS at three meetings of the Bunker Hill Task Force. EPA also coordinated extensively with the owner of the Bunker Hill Mine, the entity most directly involved and impacted by remedial actions, from the earliest scoping phase of the RI/FS. Please see Section 1.4 of the ROD Amendment for a discussion of additional community participation activities. |
| 8.4 | (b) (6)<br>Transcript (Page 63, Line 14) | (b) (6) expressed great displeasure with the availability of the documents being discussed at the public meeting and requested a 90-day comment period extension. (b) (6) also expressed dissatisfaction with the way the Bunker Hill Superfund Site has been handled. | The RI/FS, Proposed Plan, and other related reports and documents relevant to the development of remedial alternatives for long term mine water management were contained in the Administrative Record file for this action available at the Kellogg Public Library at the start of the public comment period. In addition, the RI/FS, Proposed Plan, and treatability study report were also available on the Bunker Hill website. A fact sheet and newspaper article were also issued which identified the location of these documents and noted that copies would be mailed directly upon request. A 35 day extension to the public comment period was granted upon request. |
| 8.5 | (b) (6)<br>Transcript (Page 77, Line 17) | (b) (6) stated that he felt that the comments of the public were not being forwarded to the decision-makers in the EPA and DEQ. (b) (6) felt that the representatives present at the meeting were not the decision-makers and would not "stand up" for the opinions expressed at the meeting. | In order to hear public concerns directly, EPA staff were accompanied at the public meeting by the EPA Unit Manager with responsibility for overall management of the Bunker Hill Superfund Site. In addition, EPA managers were briefed by EPA staff on community concerns prior to signature of the ROD Amendment. |

## 9. Comments Regarding Coordination of Efforts for all OUs

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| Comment Number | Received From | Comment | Response |
|---|---|---|---|
| 9.1 | Coeur d'Alene Tribe<br>(May 18, 2001) | How does EPA intend to "coordinate" three separate Silver Valley cleanup/mitigation efforts- (1) the BHSF "box," (2) the FS and eventual ROD for the rest of the CdA Basin, and (3) this Bunker Hill AMD treatment package. Obviously the South Fork, lower Coeur d'Alene River and Lake Coeur d'Alene metals TMDL targets will not be achieved without all three of these efforts being coordinated. We cannot continue to pretend that these are all independent efforts that can stand on their own. How do we do this, and when? | EPA has already taken steps to integrate cleanup activities within the "box" and the greater Coeur d'Alene River Basin. For example, EPA has recently hired a Team Leader with overall project management responsibility for both the "box" and Basin projects. In addition, the "box" site-wide surface water and ground water monitoring program is currently being evaluated and enhanced in order to ensure the collection of data that will allow comparison of contaminant sources within the "box" to sources within the Basin. This type of information will be used to set priorities for future project funding. For the Mine Water ROD Amendment, the central treatment plant could possibly be expanded to accept other contaminated water sources in the Basin. Various factors would first have to be assessed including any physical limitations, the quality and quantity of any additional sources, and the need for treatability studies, process changes, and treatment capacity upgrades. |
| 9.2 | Spokane Tribe of Indians<br>(August 8, 2001) | This document should indicate the positive benefit obtained by the entire facility (OU4) as the source is treated. This should be in the form of concentration (or TMDL multiples or some other equally applicable metric) predicted over time at a given point (preferably the Washington-Idaho border). | The Proposed Plan and the RI/FS focused on the Bunker Hill mine water and the CTP. Predicting benefits to the broader river system was beyond the scope of this project. Installation of mitigation measures and upgrades to the CTP should result in the CTP meeting its TMDL wasteload allocation, and the effluent will actually dilute concentrations of metals in the river. |

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## 10. Miscellaneous Comments

| Comment Number | Received From | Comment | Response |
|---|---|---|---|
| 10.1 | Unidentified Speaker<br>Transcript (Page 32, Line 19) | The speaker was interested in how much of the town had been remediated, how much was left, how long it was going to take to be complete, and what is the priority system for lawn cleanup. | There is an ongoing yard cleanup program that is about two-fifths complete. About three-fifths of Kellogg and one-half of Warner remain to be done. The upstream mining group drives remediation efforts and they have been working in Pinehurst for three years. After they are done they will move back to Kellogg. They are mandated to complete 200 residential properties within their area. Priority is given to high-risk yards. High-risk yards are determined to be those where a child up to six years old or a pregnant woman resides on the property. High-risk yards are normally remediated within one year of classification. After high-risk yards are complete, the upstream mining group identifies what properties will be cleaned up in a specific area. |
| 10.2 | (b) (6)<br>Transcript (Page 42, Line 10) | (b) (6) would like to know why his commercial property has not been cleaned up after waiting for three and a half years. | The upstream mining group drives the yard cleanup program in the Basin. The EPA and DEQ have no control over where the cleanups will be performed other than the fact that the upstream mining group must clean up 200 residential yards per year. Future cleanup locations, other than high-risk yards, are at the discretion of the upstream mining group. |
| 10.3 | Unidentified Speaker<br>Transcript (Page 44, Line 11) | The speaker wanted to know, why clean up things that people pay for as supplements in the grocery store (i.e., zinc). | Although many minerals are required to maintain adequate nutrition and good health, excessive or insufficient quantities can be unhealthy to people (Casarett, Klaassen, Amdur & Doull, 1996). Recommended dietary levels of vitamins and minerals have been developed by the National Research Council and these values appear on food and supplement labels (National Research Council Subcommittee Food and Nutrition Board Commission on Life Sciences, 1989). For zinc, the safe amount released to the South Fork Coeur d'Alene River will be lower for aquatic life than for people. The recommended safe level or reference dose for zinc is 0.3 mg/kg*day (22.5 mg for a 75 kg adult) (U.S. Environmental Protection Agency, 1992). This level is based on adverse health effects, impaired enzyme function, in a clinical study of women given 50 mg of zinc supplements per day (Yadrick, Kenney & Winterfeldt, 1989). Depending upon the amount of exposure to mine water, safe levels of zinc could be exceeded by untreated zinc discharges which range from 60 to 700 mg/liter.<br><br>Additionally, colloidal silver suspensions marketed as health tonics are potentially toxic and health benefits have not been demonstrated (Fung & Bowen, 1996). The reference dose for silver is .005 mg/kg*day based on skin discoloration (agyrosis) in adults receiving silver medication in 1935. Since that time, medicinal use of silver has been replaced with safer and more effective antibiotics (Fung & Bowen, 1996). Depending upon the amount of exposure to mine water, safe levels of silver could be exceeded by untreated silver discharges which range from .002 to .05 mg/liter.<br><br>References:<br><br>Casarett, L.J., Klaassen, C.D., Amdur, M.O. & Doull, J. (1996). *Casarett and Doull's toxicology : the basic science of poisons*. McGraw-Hill Health Professions Division: New York.<br>Fung, M.C. & Bowen, D.L. (1996). Silver products for medical indications: risk-benefit assessment. *J Toxicol Clin Toxicol*, **34**, 119-26. http://www.ncbi.nlm.nih.gov/htbin-post/Entrez/query?db=m&form=6&dopt=r&uid=8632503<br>National Research Council Subcommittee Food and Nutrition Board Commission on Life Sciences. (1989). *Recommended dietary allowances Tenth Edition of the RDAs*. National Academy Press: Washington D.C.<br>U.S. Environmental Protection Agency. (1992). Integrated Risk Information System (IRIS) for Zinc, Vol. 2001. U.S. EPA November 1, 2001. http://www.epa.gov/iris/prototype/index.html<br><br>Yadrick, M.K., Kenney, M.A. & Winterfeldt, E.A. (1989). Iron, copper, and zinc status: response to supplementation with zinc or zinc and iron in adult females. *Am J Clin Nutr*, **49**, 145-50. http://www.ncbi.nlm.nih.gov/htbin-post/Entrez/query?db=m&form=6&dopt=r&uid=2912000 |

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| Comment Number | Received From | Comment | Response |
|---|---|---|---|
| 10.4 | Unidentified Speaker<br>Transcript (Page 51, Line 11) | The speaker asked for clarification as to why Alt. 3 and not Alt. 4 was chosen given the relatively small cost difference and the chances for greater reductions in sludge volume with Alt. 4. | Alternative 3 includes source control measures which are expected to reduce peak flows and make the mine water more manageable and less likely to exceed the capacity of downstream management systems. Alternative 3 was chosen over Alternative 4 due to the unknowns involved in the number of mitigations to be constructed initially. Both Alternative 3 and Alternative 4 begin with mitigation efforts in the same areas where mitigation efforts are expected to provide the greatest impact. After effectiveness monitoring, Alternative 3 could turn into Alternative 4 if the additional mitigations under Alternative 4 were found to be needed. |
| 10.5 | (b) (6) | All the work you have done in Milo Creek has done exactly what Mr. Hopper repeatedly warned you it would – create more infiltration into the Bunker Hill Mine, thus larger volumes of discharge from the KT, resulting in more water to be treated. Why have you progressed to the public hearing stage with a water management plan for the Bunker Hill Mine, which you do not own, and still do not have a management plan for the Milo Creek fiasco which you have already constructed? | Historical information dating back to the 1970's indicates that infiltration into the Bunker Hill mine through the main stem of Milo Creek has occurred in the past. It is possible that construction activities, e.g., stream bed excavation which could remove the accumulated fine sediment and metals precipitation layer, could increase the permeability of the stream channel and result in increased infiltration to the mine. In-mine monitoring data collected by EPA in 1998 and 1999 was inconclusive as to the degree of any current infiltration. However, when compared to similar data collected in the mid-1980's, the 1998/1999 data indicates that flow volumes in those areas of the mine influenced by main stem Milo Creek are not significantly different. |
| 10.6 | (b) (6)<br>July 27, 2001 | (b) (6) expressed concern over acid water in Milo Creek eating away the bands, grates, and ladders of the Milo Creek flood control project. | In the spring of 2001 it was noted that the discharge of water from the Reed Tunnel, which is located at the Reed Landing area in Milo Gulch, was higher than normal. In response EPA had a sample collected on May 9, 2001, and the New Bunker Hill Mining Company (NBHMC) was contacted and asked to investigate. NBHMC reported back to EPA that rock and timber had plugged a ditch, and after the ditch was cleaned the water was diverted back into the mine. After this work was completed the flow from the Reed Tunnel was observed to be lower and another sample was collected on August 17, 2001. Based on the sample results the water quality improved from the May 9 to August 17 sample dates. The May 9 sample had a pH of 3.4 and had zinc present at 9.9 mg/L.. The August 17 sample had a pH of 5.4 and a zinc concentration of 0.98 mg/L. |